NETWORK WORLD
The Newsweekly of User Networking Strategies
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# Lotus offers a powerful new Notes

By Bob Brown
Senior Editor

CAMBRIDGE, Mass. — Lotus Development Corp. last week rolled out a new version of its Notes groupware packed with enhancements that include support for Banyan Systems, Inc.'s VINES and remote workstations, as well as improved application integration and security features.

Notes, introduced about a year ago, is a client/server application that enables users on multiple local-area networks to share documents and exchange electronic messages, among other things.

**Lotus to acquire leading LAN E-mail supplier. Page 2.**

The software is currently being used at roughly 75 companies by some 35,000 end users.

Version 2.0 of Notes, which features enhancements sought after by users of the original version, drew praise from analysts and users.

"Notes 2.0 is light-years ahead of Version 1.0 from an architecture and capabilities standpoint," said John Dunkle, vice-president at WorkGroup Technologies, Inc., an industry consulting firm in Hampton, N.H.

*(continued on page 6)*

PHOTO ©1991 KURT STIER
IBM's James Cannavino details NetWare reseller program.

# *Mainframes take on role as LAN servers, but slowly*

By Paul Desmond
Senior Editor

Although some users are employing mainframes on a limited basis as servers for local-area networks, users and analysts say that much work remains before hosts can be truly effective in that role.

Mainframes are particularly suited for use as data base servers or for archiving data and backing up files from smaller LAN servers, according to industry observers.

Some contend that LAN users could also benefit from access to host peripherals such as printers and tape storage.

But users say no one has stepped forward with a product that addresses all those areas, although major vendors are beginning to answer the call.

For example, IBM recently demonstrated two mainframe/server products (see "IBM wares let mainframes act as servers," page 58). And Unisys Corp. is expected to announce products next week that will enable users to employ its A Series mainframes as LAN servers.

Ron Peri, president of Computer Support of North America, Inc., a consultancy in Basking Ridge, N.J., said mainframe channels are a problem when using hosts as servers.

Those channels are meant to link mainframes with front-end processors and direct-access storage devices. They are not intended to link a mainframe to a LAN supporting personal computers.

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# IBM, Novell finalize NetWare resale deal

## IBM will market NetWare and its own LAN Server; Novell will offer NetWare versions for OS/2, AIX.

By Eric Smalley
Senior Editor

BOSTON — As expected, IBM and Novell, Inc. last week forged stronger ties with the announcement at the NetWorld '91 Boston trade show that IBM will resell Novell's NetWare local-area network operating system.

The two companies announced a product licensing, distribution and support relationship under which IBM will market, service and support NetWare.

Novell will also offer a version of NetWare for OS/2 and another for AIX running on the IBM RISC System/6000 platform.

Despite assurances from the companies, users expressed concern about the future of both vendors' networking strategies (see "Users wary of IBM pact to resell NetWare," page 6).

"Choice is a priority; our customers are requiring it," said James Cannavino, IBM vice-president and general manager of the Personal Systems division. "With this relationship, we can offer them a choice of major operating systems, each with its own inherent strengths."

For Novell users, the relationship means increased access to IBM environments through concurrent LAN Server and NetWare support, ties to the NetView network management system and a

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**INSIDE**

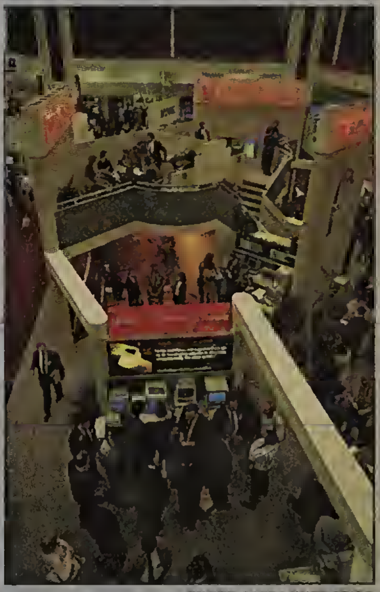
PHOTO ©1991 KURT STIER
See NetWorld '91 coverage throughout this issue.

# NETLINE

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**EUROPEAN USERS** join forces to build interoperable OSI production nets. Page 4.

**AT&T BELL LABS JOINS** with NW to test and evaluate the real-world capabilities of SNMP. Page 4.

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**DEC WINS LUCRATIVE** contract to provide the U.S. Navy with PCs, LANs and integration services. Page 6.

**UNSHIELDED WIRING** and an elevator used only on Wednesday mornings lead to "Alligators in the Swamp." Page 59.

NEWSPAPER

**FEATURE**

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# Users see clear value in image networking

By Salvatore Salamone
Features Writer

Office automation analysts have long prophesied the arrival of the image networking era. The potential benefits of imaging are obvious — the ability to store on-line items such as letters, canceled checks, X-ray photographs and maps, and to summon them as necessary across a network.

But with a few exceptions, users have not been enthusiastic about image networking. Although hailed in the mid-1960s as a great productivity booster, only 71 U.S. firms were using imaging systems 20 years later, according to a report by International Data Corp. (IDC), a research and consulting firm in Framingham, Mass.

For various reasons, mainly high prices and low flexibility, most users have been reluctant to commit to image networking. Until now.

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# Users lament Tariff 12's inflexibility

By Bob Wallace
Senior Editor

Tariff 12 customers who entered into what they viewed as strategic partnerships with AT&T are expressing concern about the difficulty of incorporating new services into their custom network arrangements.

Users believed their close relationship with AT&T would give them first crack at new offerings. But some are finding that, because of regulatory requirements, it can take months to add services to their Tariff 12 packages and other customers can bring the offerings on-line more quickly.

That problem has been a factor in some users' decisions not to go with Tariff 12.

*(continued on page 57)*

# Lotus announces proposal for acquisition of cc:Mail

## Move puts Lotus at top of LAN messaging mart, gives cc:Mail support it needs to keep growing.

**By Wayne Eckerson**
Senior Editor

BOSTON — In a widely applauded move, Lotus Development Corp. last week announced at NetWorld '91 Boston that it will acquire cc:Mail, Inc., a leading supplier of local-area network electronic mail systems.

The deal, which is supposed to be finalized within the next 30 days, will make Lotus a leading supplier of LAN-based messaging systems and give cc:Mail the marketing and distribution support it needs to continue its rapid growth, industry observers said.

"It's exactly the kind of corporate marriage you like to see," said Richard Miller, president and chief executive officer of Rapport Communication, Inc., a consulting firm in Palo Alto, Calif., specializing in messaging and data communications.

Terms of the agreement were not disclosed, but industry analysts estimated that Lotus will pay between $20 million and $30 million for privately held cc:Mail, which last year had revenues of $7.5 million.

With cc:Mail, Lotus will get a complement to Lotus Notes, a communications and document-sharing software package that coordinates the flow of work among groups of LAN users.

While Notes is designed specif-

*(continued on page 4)*

# Motorola unveils wireless Ethernet local net offering

## WIN technology reduces cost of node changes.

**By Eric Smalley**
Senior Editor

BOSTON — Motorola, Inc. introduced at the NetWorld '91 Boston trade show last week a wireless Ethernet local-area network based on technology it first unveiled in October.

The Altair product, which employs Motorola's Wireless In-building Network (WIN) radio technology, uses 18-GHz signals to support as many as 32 Ethernet devices in microcells that are 80 feet in diameter, according to Mil Ovan, senior marketing manager of Motorola's Altair product operations.

Altair is targeted at users that must frequently move, add or change network nodes, Ovan said. Using wireless technology helps users avoid the cost of implementing and maintaining network cable plants.

Advantages of the Altair product include the 15M bit/sec transmission rate of the WIN technology and support for the IEEE 802.3 Ethernet standard.

Altair has two components, a Control Module and a User Module. Both modules have radio transceivers. The User Module can be linked to as many as six Ethernet devices via thin-wire coaxial cable.

*(continued on page 57)*

# MCI switch upgrade widens service options for users

**By Anita Taff**
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. last week announced it has begun a major upgrade of its network switches that will double port capacity in the net and position the carrier to provide advanced services.

The switch upgrade positions MCI to offer frame relay, fast packet switching and Synchronous Optical Network (SONET) services, although the carrier has not committed to rolling out any of those services. The upgrade will also support switched T-1 service, which MCI is scheduled to offer in the third quarter, and possibly switched T-3.

MCI has already upgraded three of its switches from DSC Communications Corp. and one of its Northern Telecom, Inc. switches. Later this month, the carrier will begin upgrading switches at central offices in Atlanta, Miami and New York. It will enhance switches in other locations about every two to four weeks thereafter.

Once the upgrade is complete, MCI's network will have twice its current capacity, with each switch's capacity increasing from between 30,000 and 50,000 ports to between 80,000 and

*(continued on page 58)*

# Briefs

**Nynex to suspend gateway service.** Nynex Corp. last week announced plans to suspend its money-losing Info-Look gateway service in May. The service, which enables users of personal computers to dial a Nynex number to gain access to a range of information services, has been losing millions of dollars annually, Nynex said. Info-Look could be started up again, however, if economic and regulatory conditions improve. Nynex blamed the restrictions of the Modified Final Judgment for limiting the service's success.

**Intel superchip developed.** Intel Corp. last week announced that it has developed a 100-MHz version of its 80486 microprocessor, a device that, according to the company, can process approximately twice as many instructions per second as any other microprocessor. The current top-of-the-line 486 processor operates at 33 MHz. The company does not have plans to offer a commercial 100-MHz device, claiming this achievement is but one of many breakthroughs needed to reach the company's goal of providing, by the year 2000, a 100 million-transistor, 250-MHz microprocessor that can process two billion instructions per second.

**NSFNET to link with France, Sweden.** US Sprint Communications Co. last week announced it will provide the National Science Foundation Network (NSFNET) with two 128K bit/sec lines to link the NSFNET high-speed research net to France and Sweden. NSFNET will be connected to France's research network at Sophia Antipolis, France, and to the Scandinavian net in Stockholm.

**Frame relay vendors unite.** A group of 42 vendors last week announced formation of a Frame Relay Implementor's Forum that will ensure interoperability between products built using a specification released late last year by Cisco Systems, Inc., Digital Equipment Corp., Northern Telecom, Inc. and StrataCom, Inc. Originally conceived as a vendors-only group, the forum intends to open up membership to the user community when it meets on March 18 in Houston during Supercomm '91. At its initial meeting last month, the forum created four working committees. An organizational committee will handle administrative matters, while a technical committee will work with standards bodies, circulate technical standards to members, develop common implementation agreements and identify future frame relay improvements. A market development committee will run educational seminars and an interoperability committee will develop tests to ensure product compatibility.

**Banyan, AT&T join forces.** Banyan Systems, Inc. and AT&T Computer Systems announced a strategic relationship last week at the NetWorld '91 Boston trade show. The immediate benefit of the relationship is the access each company will gain to the other's distribution channels. The companies also announced that Banyan's VINES network operating system has been ported to AT&T's StarServer E uniprocessor server. Support for AT&T's symmetric multiprocessor StarServer E and StarLAN 10 series of concentrators is also planned. Banyan and AT&T will work to increase the interoperability of VINES and AT&T's StarGroup LAN Manager software. The initial objective of the relationship is educating resellers that offer both Banyan and AT&T products.

**StrataCom plots course for T-3.** StrataCom, Inc. is planning to announce a T-3 multiplexer in the second quarter of this year, a company spokeswoman said last week. StrataCom makes the IPX multiplexer family, which uses a proprietary fast packet switching technique to support trunk lines. The spokeswoman said the new T-3 multiplexer would also be based on a fast packet architecture.

**Radio dispatcher to get new net.** Fleet Call, Inc. last week was granted waiver requests by the Federal Communications Commission that will allow the radio dispatch company to build digital mobile communications networks in six cities where the company is experiencing frequency congestion with its analog system. The new equipment will increase Fleet Call's capacity fifteenfold, a fact that has cellular telecommunications carriers worried that Fleet Call might use the net as a way to enter the common carrier mobile phone business through the back door. FCC officials dismissed those concerns, saying the regulatory scheme governing private radio precludes that possibility.

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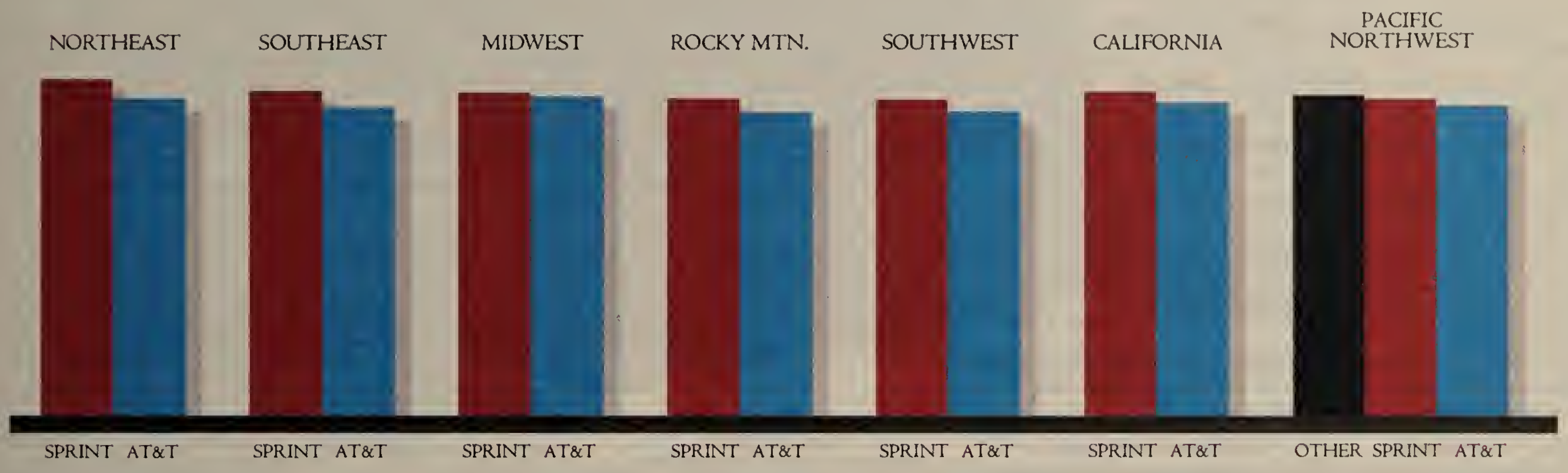

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1988 *Sprint awarded 40% of Federal Telecommunications System 2000 contract.* 1989 *Sprint completes the world's first and largest privately-owned transatlantic fiber optic cable.* 1990 *Sprint announces the first commercial video services to the Soviet Union.*

# *DEC enhances PathWorks, boosts software options*

**By Eric Smalley**
Senior Editor

BOSTON — Digital Equipment Corp. unveiled at the NetWorld '91 Boston trade show last week an update of its PathWorks personal computer networking software, along with new options for the package.

The options add support for Transmission Control Protocol/Internet Protocol, Microsoft Corp.'s Microsoft Windows 3.0 and the concurrent use of Novell, Inc.'s NetWare.

Version 1.0 of NetWare Coexistence for PathWorks for DOS lets personal computers run NetWare- and LAN Manager-based PathWorks client services concurrently, enabling them to access Novell servers and DEC PathWorks servers as easily as accessing different drives.

The NetWare and PathWorks environments remain distinct, but information and applications can be copied between the two, according to John Rose, manager of DEC's Personal Computing Systems Group. Users access the separate networks by designating each as a different drive, he said.

DEC is also examining the possibility of supporting Novell's Internetwork Packet Exchange (IPX) protocol under VMS, which would enable DEC systems to act as NetWare servers, said Vijay Thakur, DEC's group manager for personal computer integration.

DEC recognizes that NetWare is a LAN market standard, said Linda Gross, base product marketing manager of DEC's Personal Computing Systems Group. "We see ourselves as a systems integrator," she said.

Another option for PathWorks is Version 1.0 of TCP/IP for PathWorks for DOS, which allows PathWorks to use TCP/IP instead of DECnet as a transport mechanism. This will enable DEC Ultrix systems to be used as PathWorks servers. It will also allow PathWorks users to exchange mail with Unix systems, according to DEC officials.

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# US Sprint widens ISDN support, upgrades switches

## Will satisfy growing user needs and cut costs.

**By Bob Wallace**
Senior Editor

KANSAS CITY, Mo. — US Sprint Communications Co. last week said it will equip all 43 of its network switches to deliver ISDN Primary Rate Interface (PRI) service by year end.

The carrier currently offers PRI from two Northern Telecom, Inc. DMS-250 SuperNode switches — one on each coast. It also foots the bill for delivering user access lines from any of its points of presence (POP) to the PRI switches.

US Sprint said it will offer PRI on all of its switches due to rising user demand for the service and the high cost of providing access to the two PRI switches.

By comparison, AT&T currently offers Integrated Services Digital Network PRI service in 350 cities via more than 100 AT&T Network Systems Group 4ESS digital switches.

All of US Sprint's DMS-250 SuperNodes have been equipped with Northern Telecom's Batch Control Supplement 31 software, which enables the switches to support ISDN PRI service. The carrier only has to add Northern Telecom D channel handler cards in order to deliver PRI service.

"Offering ISDN [from all switches] will cut our costs and free up network bandwidth for users of services such as [US Sprint's Virtual Private Network]," said Tom Carroll, ISDN product management group manager for US Sprint. "[VPN users] are gobbling up our facilities left and right."

User demand for ISDN surpassed even US Sprint's projections. According to Carroll, more than 20 companies now use 42 PRI lines provided by US Sprint.

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**Correction:** The story "Fed agency to run FDDI to desktops" (*NW*, Feb. 11) incorrectly identified the location in which the Department of Transportation will install its proposed Fiber Distributed Data Interface network.

The network will be deployed in a new building that is scheduled for completion in 1998.

**Clarification:** The story "Hospital LAN offers users array of data" (*NW*, Feb. 11) should have noted that Children's Hospital of Philadelphia's Arcnet network was provided by Standard Microsystems Corp.

# NW, AT&T Bell Labs launch SNMP tests

FRAMINGHAM, Mass. — *Network World* last week announced it is working with AT&T Bell Laboratories to conduct a series of lab tests evaluating the real-world management capabilities of the Simple Network Management Protocol (SNMP).

Tests of products supporting the SNMP standard began last week at an AT&T Bell Labs facility in Lincroft, N.J.

Test results will be presented in a series of upcoming *Network World* feature articles on SNMP-managed local-area network bridges, LAN hubs and concentrators.

Other SNMP products may be tested in the future.

The SNMP standard is designed to enable devices to exchange management information and to ease management of multivendor networks.

The tests are designed to determine whether SNMP products work in complex networks and whether a central network administrator can effectively access and control devices using SNMP.

Almost two dozen vendors have already agreed to participate and are shipping equipment to be evaluated in the tests. The trials will be coordinated by Edwin Mier, president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy that specializes in customized protocol analysis and planning.

Carl Cirillo, director of network and systems management at AT&T Bell Labs, said, "We're pleased to be hosting this project.

"SNMP is gaining broad acceptance as a leading standard for network management," he continued. "We see it as a key element in our commitment to open systems-based network computing."

*Network World* Editor John Gallant said, "It's an honor working with Bell Labs in this effort. These tests will give our readers a better understanding of how these emerging products work in a real network environment."

# European firms unite in effort to construct OSI nets

**By Paul Desmond**
Senior Editor

PARIS — A group of major European companies is embarking on an ambitious project to establish OSI-based production networks and applications to support actual business transactions among the companies.

At least 13 companies are expected to take part in the project, the initial phase of which is being sponsored by OSITOP, a user-dominated group promoting the use of Open Systems Interconnection protocols.

"The goal of the project is to set up a live demonstration of interconnected and interoperating OSI systems," said Raanan Barzel, an internal consultant at Banque Nationale de Paris (BNP) here, an OSITOP member.

The first step toward reaching that goal was selecting the companies that would participate.

The companies include Bayer AG, Dresdner Bank AG, German chemical company Hoechst AG, Spanish power company Iberduero S.A. and Nestle SA.

Now the group is working to establish a common set of OSI-based applications. The Standards Promotion and Application Group (SPAG) and independent consultants are expected to help in that development effort, Barzel said.

He emphasized that the project will be more than a demonstration and that the participating companies will be using the OSI links to conduct day-to-day business transactions.

Among the OSI protocols likely to be employed will be the

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# Lotus announces cc:Mail purchase

*continued from page 2*

ically for select groups of LAN users who need to work in close coordination using decision support services, cc:Mail offers a versatile general-purpose messaging system that works in multivendor LAN environments.

According to Walter Ulrich, a consultant specializing in electronic messaging at Arthur D. Little, Inc. in Los Angeles, the significance of the merger is that it gives Lotus a strong product at both ends of the messaging market.

"With Notes, Lotus had the high end of the messaging market," Ulrich said. "The addition of cc:Mail means Lotus now has a mail package for the masses."

In addition to supporting messaging across multiple vendors' LANs, cc:Mail provides transparent connectivity to Digital Equipment Corp. and IBM minicomputer- and mainframe-based E-mail systems, public E-mail services and facsimile networks. It enables users to exchange messages consisting of text, graphics and images from workstations running DOS, Microsoft Corp.'s Microsoft Windows 3.0 or OS/2, as well as from Apple Computer, Inc. Macintosh computers.

Currently, cc:Mail has more than 800,000 users and approximately 35% of the market for LAN messaging systems.

According to Shelley Harrison, director of marketing at cc:Mail, the two companies will work closely to integrate both products on many levels, a process that will take between six and 30 months.

Initially, the companies will develop a more efficient gateway between cc:Mail and Notes. Then, they will standardize the user interfaces, produce joint documentation and training, and synchronize the two products' messaging directories, perhaps by combining them into a single directory, Harrison said.

She added that cc:Mail users will not be forced to migrate to Notes. "The two products are complementary but still very distinct. Each meets different user needs, and one will not replace the other," she said.

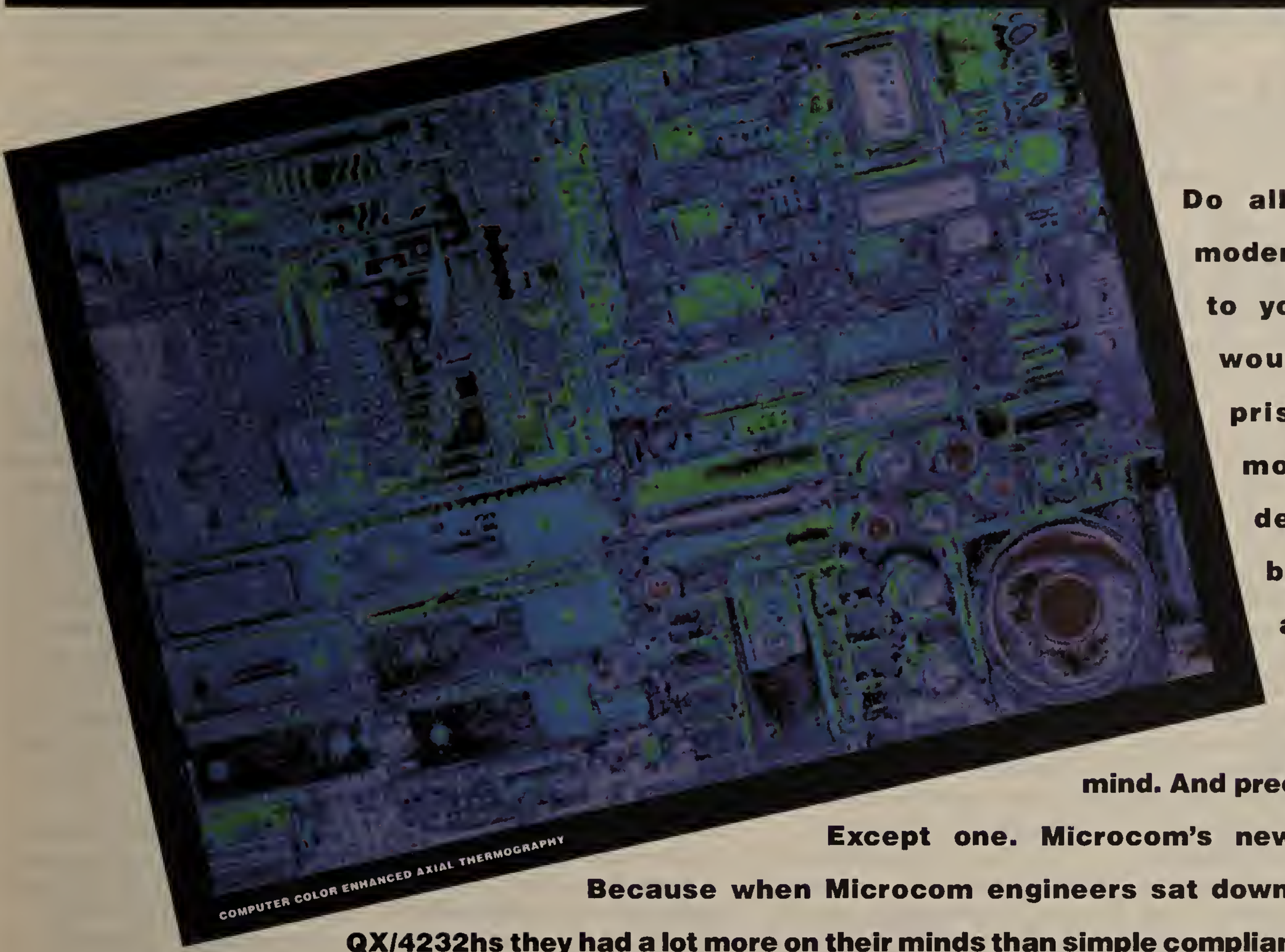
The merger will enable cc:Mail, which currently has 55 employees, to provide adequate levels of training, customer service, and sales and engineering support to meet the needs of its expanding customer base.

"Our alliance with Lotus provides the additional resources and international presence required for us to remain at the forefront of the industry," said Philippe Courtot, cc:Mail's president and CEO.

Courtot will become a divisional vice-president within Lotus and report to June Rokoff, vice-president of Lotus' Communications and Information Services Group, which oversees Notes. He said cc:Mail will continue to operate from Mountain View, Calif.

According to David Atlas, a consultant at International Data Corp. in Framingham, Mass., the merger simply formalizes an alliance that has existed between the two companies for some time.

Atlas said Lotus often heard users say Notes was perfect for about 200 of their employees who need close communications and decision support, but that they also need a basic messaging product for their 100 or so secretaries. "That's where cc:Mail came in."



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# DEC said to have garnered massive Navy LAN contract

## Deal is reportedly worth $75m over five years.

By Caryn Gillooly
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week won a preliminary contract from the U.S. Air Force Computer Acquisitions Center (AFCAC) to provide the Navy with personal computers and local-area networks and to help integrate the equipment with existing systems, according to sources.

Ultimately, the network that DEC will help build will link some 8,000 LANs supporting as many as three million personal computers.

The contract is said to be worth close to $75 million and extend over a five-year period. To win that contract, sources said DEC bid Novell, Inc.'s NetWare network operating system and Tandy Computers, Inc. personal computers.

"This contract is what's known in the industry as a 'hummer,' " said one vendor source who requested anonymity. "That means it's huge."

AFCAC confirmed that a preliminary decision has been made concerning the contract. "The losing vendors have been notified, and the potential winner has been notified," according to AFCAC's Lt. Phil Hattwick. He added, however, that the process is not yet complete.

"For the final award to be made, the winner is required to complete a live test of the products. We have narrowed it down but are not making any announcements until we know we have a final winner."

Sources said the final contract should be awarded in March.

The significance of the contract is DEC's apparent win over other vendors that have a stronger presence in the LAN market. "This puts DEC squarely in the PC LAN business in a big way," the vendor source said.

The other significant factor is DEC's bid of NetWare, instead of its own LAN Manager-based PathWorks networking software.

According to sources, many of the apparent losing vendors bid Microsoft Corp.'s LAN Manager. They agreed this could be seen as a serious blow to Microsoft's flagship network operating system, particularly at a time when its future is in question. DEC refused to comment on the issue.

# Lotus offers a powerful Notes

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"It's a much more open product in terms of supporting applications, imaging and running on VINES, and [it] is more sophisticated in its security."

Brian Plackis, a network manager at MCI Communications Corp. in Richardson, Texas, said, "The best thing about VINES support is that we'll be able to have users dial into the VINES network and have access to any Notes server. Before, users had to dial into a specific Notes server."

With the earlier version, VINES users had to install Network Basic I/O System drivers on all net interfaces.

Beckman, who recently helped form the Network Applications Consortium, a group of users pushing for development of client/server applications, said plans are under way to tie group members together via Notes.

Another Notes 2.0 enhancement, support for remote computers, will enable users on the road or in offices without LANs to exchange mail or share data bases with other Notes users.

"This was a hot button for us," said Sheldon Laube, national director of information and technology for the accounting firm of Price Waterhouse in New York, which currently has some 5,000 Notes users in 70 offices. "Our people spend a lot of time at client sites and need to dial in."

Laube added that he and other users also pushed Lotus to provide upgraded security capabilities in Notes 2.0, including physical encryption of data as it is stored on a disk. Previously, Notes incorporated public key encryption technology.

"Notes 2.0's security features let us control access not only to data bases, but to documents within data bases and to portions of those documents," Laube said.

Notes 2.0 also features improved application integration by supporting the new Object Linking and Embedding (OLE) specification released by Microsoft Corp. in December 1990. That will make it easier for Notes users to build compound documents comprising data from multiple applications.

Lotus is also supporting Dynamic Data Exchange (DDE), which enables Notes users to construct dynamic links between Notes and applications supporting OLE. Notes documents will be updated automatically when changes are made to other files.

"Now users can work with Notes and feed into any application that supports DDE," a Lotus spokeswoman said.

"DDE lets us use Notes as a presentation and dissemination vehicle for our other applications," MCI's Plackis said. "Our executives can deal with Notes without having to learn how to use a lot of other applications."

Imaging has also been improved in Version 2.0. Among other upgrades, text fields can hold images up to 4G bytes, including large bitmaps. Previously, they supported 64K bytes.

"The ability to import large bitmaps has allowed us to introduce engineering drawings, word processing and scanned pictures into the Notes environment," said Kevin Hibbert, staff manager at New England Telephone and Telegraph Co.'s net engineering headquarters.

At a press briefing here, Lotus executives also discussed future directions for Notes, though they declined to provide details.

The software maker said it plans to let Notes run on Unix computers, provide improved text retrieval capabilities and upgrade net management features.

Lotus will focus on integrating Notes with cc:Mail, Inc.'s LAN-based electronic mail product as well as other E-mail offerings (see "Lotus announces proposal for acquisition of cc:Mail," page 2). Lotus will also support the X.400 messaging standard and the X.500 directory services standard.

Wide-area support will be extended beyond asynchronous dial-up to include X.25 and IBM's Systems Network Architecture.

Notes Version 2.0 is expected to ship in March. The product will be sold to large customers by Lotus' direct sales force for $62,500 per 200 workstation users.

# IBM, Novell finalize deal

*continued from page 1*

firm commitment from Novell to support OS/2.

Novell customers "want to ease the integration of NetWare LANs into their larger IBM networks," said Raymond Noorda, chairman of Novell. "Many of our customers are also developing applications on OS/2 and want the services and support of NetWare. We had no choice but to offer an OS/2 version."

With currently available versions of NetWare, DOS clients can access OS/2 LAN Server and NetWare servers concurrently if they run both the DOS requestor and the NetWare shell. OS/2 clients will have the same ability when Novell releases NetWare for OS/2, IBM reported.

Darrell Miller, Novell executive vice-president, said the release of NetWare for OS/2 and NetWare for AIX is expected sometime in 1992.

Once NetWare is available for the OS/2 platform, it will be integrated with the IBM OS/2 Communications Manager and Database Manager, according to IBM officials. The Communications Manager gives OS/2 systems access to IBM hosts and other systems, and the Database Manager gives OS/2 systems access to IBM data bases.

According to Noorda, the relationship between IBM and Novell will accelerate growth of distributed processing. It will certainly accelerate the growth of Novell sales, according to analysts.

"The impact on Novell will be remarkable," said Mark Freund, president of Interconnections Network Consulting Group, Inc. in Santa Monica, Calif. "It will as much as double their revenue in the next year."

Through IBM, Novell will be marketing to MIS managers, resulting in increasingly larger sales than Novell gains from its traditional department manager customer, he said.

IBM's new relationship with Novell, coupled with the chill in the relationship between IBM and Microsoft Corp., has raised questions about IBM's commitment to its LAN Server, which is based on Microsoft's LAN Manager.

Cannavino sought to assure IBM users that the company was not abandoning its customer base.

"Don't read into this that there's any right- or left-hand turn away from LAN Server," he said. "We will continue to enhance and support that product, and it will continue to offer strengths — such as host access over [Systems Network Architecture] — that aren't as prevalent in NetWare."

*(continued on page 57)*

# Users wary of IBM pact to resell NetWare

BOSTON — A tidal wave of confusion and uncertainty swept over the local-area network community last week with the announcement at NetWorld '91 Boston that IBM will be reselling Novell, Inc.'s NetWare net operating system.

Users are now trying to piece together the new LAN operating system picture and figure out the implications of the deal with regard to their current operating environments and future strategic directions — despite IBM and Novell assurances that nothing has changed.

The two companies emphasized that this is a sales and marketing agreement and their individual LAN operating systems will not be affected.

In response to questions about whether the agreement might lead to NetWare losing its identity and integrity as a Novell product, Darrell Miller, Novell's executive vice-president of marketing and services, stressed that Novell "is not doing joint development with IBM. Both are completely separate entities." IBM's participation, he said, will not change the underlying operating system.

James Cannavino, IBM's vice-president and general manager for personal systems, assured NetWorld attendees that there have been no changes in the plan to eliminate the differences between IBM's LAN Server net operating system and the original product it was based on, Microsoft Corp.'s LAN Manager. IBM will sell and support LAN Server and NetWare equally.

Users did not seem satisfied with IBM's assurances. One user at the show expressed concern that the vendor would ultimately drop support for LAN Manager. But the overwhelming question from users and vendors was what effect this will have on demand for LAN Manager.

"My only concern is what it might do to Microsoft," said Katherine De Bruyn, MIS director at Perkins-Coie, a law firm in Seattle that is using Microsoft's LAN Manager. "If enough other codevelopers drop out and Microsoft is the only one left holding the bag, I wonder if they'll want to continue holding it."

Barry Trent, president of Triticom, a network management software developer in St. Paul, Minn., has changed his product strategies as a direct result of the announcement.

Triticom currently sells a remote network management product based on NetWare. Trent said that prior to the announcement, he was planning to develop a product based on LAN Manager.

"Those plans are now on hold until we see just how many people are still going to want to buy LAN Manager or how much longer LAN Manager is going to be around," he said.

"LAN Manager and LAN Server users have to wonder whether IBM will dead-end the technology," said Lou Giglio, vice-president at Bear, Stearns & Company, Inc. in New York.

"But also keep in mind that IBM has supported multiple operating systems for years. They're willing to have an alphabet soup of operating systems; look at their mainframe environment," he said.

Lee Doyle, an analyst at International Data Corp., a research firm in Framingham, Mass., agreed.

"This certainly blunts the momentum Microsoft is trying to create [behind LAN Manager]," he said. "But IBM isn't going to drop LAN Manager."

— *Caryn Gillooly*

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## Worth Noting

"The ultimate success of Novell's taking over development of [Action Technologies, Inc.'s Message Handling Service] will depend on Novell's implementation of MHS Version 1.5."

**Howard Case**
Vice-president of sales and marketing
Enable Software/
The Higgins Group
Alameda, Calif.

## People & Positions

**Thomas Mayer** has been named vice-president and general manager/North America at **Mitel Corp.** of Kanata, Ont., and president of its U.S. subsidiary, Mitel, Inc.

The announcement followed the resignation of John Combs, who was vice-president and general manager of Mitel Corp. and president of Mitel, Inc. Combs is said to have left to pursue other business interests.

Mayer was recently president and chief executive officer of another private branch exchange maker, InteCom, Inc. Before joining InteCom in 1988, Mayer was executive vice-president at Mitel Corp.

**Gabe Battista** was recently named to the newly created position of chief operating officer at **Cable & Wireless Communications, Inc.** in Vienna, Va.

Battista will be responsible for the long-haul carrier's day-to-day operations and will report to Alan Peyser, president of Cable & Wireless. Previously, Battista served on a three-person executive committee that ran the day-to-day operations of Telesphere Telecommunications, Inc.

Peyser, who was responsible for the firm's day-to-day operations, will now devote more time to the company's strategic operations. ◻

# Retailer expands MCI deal, examines global services

Woolworth looks at services for business abroad.

By Bob Brown
Senior Editor

NEW YORK — Woolworth Corp. recently replaced an existing three-year, $12 million contract with MCI Communications Corp. with a new deal for global MCI services worth $15 million over three years.

Woolworth also gave a vote of confidence to MCI's increased focus on international networking. Under the contract, the retailer could begin migrating some of its 2,000 stores outside the U.S. onto its corporate net with MCI's assistance.

Recent international developments for MCI include a closer relationship with Infonet Services Corp., in which MCI holds a financial stake; the recent introduction of MCI's Global Communications Service for helping users build international nets; and the expansion of MCI's Vnet virtual network service to more countries.

William Johnson, Woolworth's director of telecommunications, said MCI's growing strength in providing international network services could fit nicely with the rapid expansion of Woolworth's Foot Locker subsidiary and other businesses overseas.

"Our international sites now are supported mainly by dial-up service and public packet services," Johnson said. "It would be attractive to extend our Vnet to include some of these sites overseas."

Woolworth will also take a serious look at MCI's new Global Communications Service, Johnson said. While he said he believes foreign telecommunications administrations will come together and agree on standards, that could take 10 to 12 years. Also, he said, Woolworth might need MCI's assistance in dealing with these overseas organizations when it expands its international network.

Replacing the agreement signed in late 1989, the new contract calls for MCI to carry nearly all of Woolworth's domestic and international voice traffic from more than 6,000 sites in the U.S.

Under the contract, Woolworth will expand its use of MCI's Vnet, which the company uses to connect its corporate headquarters with regional and district offices.

The new contract also calls for use of the MCI 800 Service for Woolworth's 24-hour consumer help line, MCI's Corporate Account Service for detailed management reports at thousands of retail sites and MCI's Network Information Management System for network traffic reports. ◻

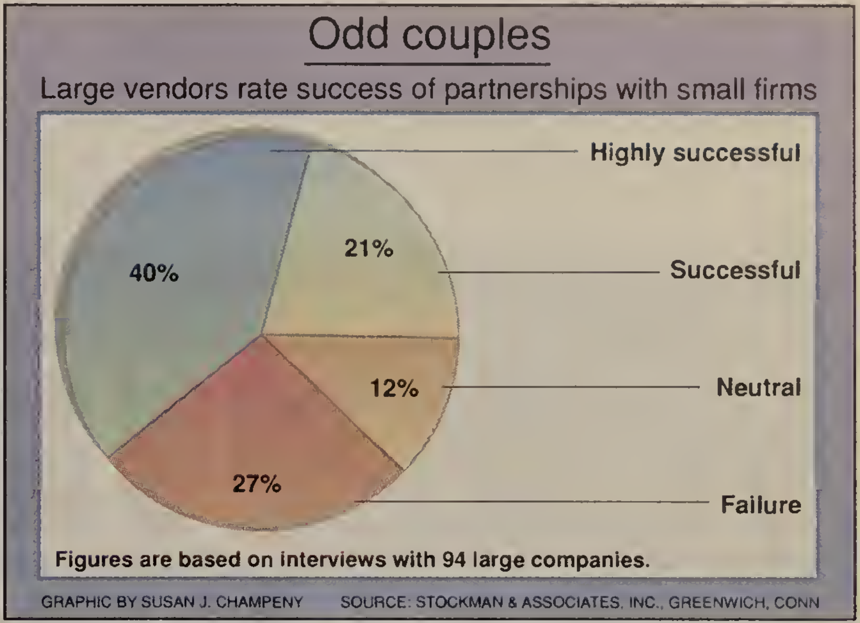
## INDUSTRY BRIEFS

**US Sprint operating profit off, revenue up.** United Telecommunications, Inc. recently reported that its US Sprint Communications Co. business posted a fourth-quarter operating profit of $51 million. Despite revenue gains, the figure was down 37% from operating profits of $81 million in the fourth quarter of 1989. Revenue for the fourth quarter, ended Dec. 31, 1990, was $1.33 billion, up 11.7% from $1.19 billion in the corresponding quarter of 1989.

Increased data system sales overseas contributed to revenue growth during the fourth quarter. Operating profit was reduced in part because of sales and marketing expenses related to US Sprint's advertising and promotional efforts, said William Esrey, chairman and chief executive officer of United Telecom.

For the year, US Sprint generated $148 million in operating profit (after a nonrecurring charge in the second quarter of $72 million), compared to $227 million in operating profit for 1989. US Sprint reported revenue of $5.06 billion for 1990, up 17% compared with revenue of $4.32 billion in 1989.

**Siemens, Gandalf join forces.** Gandalf Technologies, Inc. of Ontario, Canada, recently announced it has signed an agreement with Munich, Germany-based Siemens PN Private Communications Systems to cooperate in development and marketing of private branch exchange-supported data communications and related management systems. ◻



Odd couples

Large vendors rate success of partnerships with small firms

Figures are based on interviews with 94 large companies.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: STOCKMAN & ASSOCIATES, INC., GREENWICH, CONN

# Study identifies keys to good partnerships

Year-long study about strategic alliances between large and small firms says flexibility is critical.

By Bob Brown
Senior Editor

GREENWICH, Conn. — A new study about strategic alliances between established companies and small or startup firms has revealed several keys to building successful relationships.

Among the requirements identified as critical were the need for a flexible contract that can change with evolving business objectives and market conditions, alignment of the partnership's goals with the partners' core business objectives and managing the alliance at an operational level.

The year-long study was conducted by consultancy Stockman & Associates, Inc., based here, on behalf of 11 firms — including AT&T, Hewlett-Packard Co. and IBM. Areas studied were alliance objectives, finding partners, operating structures, managing the relationship and performance evaluation.

With competition in the network equipment and service industry heating up, established vendors are increasingly on the lookout to partner with upstart companies that can give them a technological or marketing edge, said Jennifer Blei Stockman, president and chief executive officer of Stockman & Associates.

These alliances — ranging from comarketing to joint development agreements — enable large vendors to focus on upgrading their core product lines without having to reinvent the wheel when it comes to providing customers with new or related technologies and products, Stockman said. For the smaller firms, the deals often provide financial backing and a broader distribution channel for their wares, she said.

"Users gain because they can go out and purchase a new technology but lessen the risk of doing so by purchasing it from a company backed by an established company," Stockman said.

Teaming, however, doesn't gaurantee success. "Those relationships that are based solely on the larger company taking an equity position in the smaller company, for example, are often setups for disappointment," Stockman said.

Partnerships structured with equity only are four times as likely to fail as other alliances, she said.

For the smaller firms, the deals often provide financial backing and broader distribution.

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Terry Lawrence, vice-president of strategic relations at Vitalink Communications Corp., a $66.8 million maker of internetworking equipment, agreed that there needs to be more of a commitment than just an equity investment.

Vitalink this year has announced it will take an equity interest in two new partners — Netlink, Inc., a maker of Systems Network Architecture connectivity products, and Coral Network Corp., a start-up that makes

(continued on page 10)

## Keys to good partnerships

*continued from page 9*

broadband network switches. But both firms are also expected to be long-term product development partners for Vitalink, which will sell switches made by Coral as the high end of its product line.

"You have to end up with a win-win situation," Lawrence said. "If both companies win, then the customer has to win."

This means that vendors are better off engaging in a long-term relationship than "chasing down the hot new box every six months," he said.

Once an alliance has been formed, the most critical issues facing the partners are managing it and evaluating its performance, Stockman said.

The study recommended that large companies manage relationships with smaller firms at the operational business unit level but with corporate support. Stockman said an evaluation program must be put in place that allows the partners to measure the performance of the relationship in a tangible way as well.

Loretta Robinson, district manager for intermediary marketing within AT&T's Business Communications Service organization in Basking Ridge, N.J., agreed that an evaluation process is vital to keep tabs on a relationship with another vendor. ◘

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PC Magazine, 12/11/90 (Ziff-Davis Publishing) "9600-BPS MODEMS: Breaking the Speed Barrier-PC LAN Labs tests seven rapid-fire modems complying with V.32, V.42 and V.42bis standards."

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# EDS selects Retix for OSI Defense deal

By Ellen Messmer
Washington Correspondent

SANTA MONICA, Calif. — Retix Corp. recently announced that it has been selected by Electronic Data Systems Corp. (EDS) as a supplier of Open Systems Interconnection products for a large Department of Defense contract.

Retix, a subcontractor to EDS for the U.S. Army Information Systems' Small Multiuser Contract (SMC), will supply the government with its X.400 Message Handling System (MHS), File Transfer, Access and Management (FTAM) and virtual terminal software for workstations and servers.

The Army-sponsored umbrella contract, which the U.S. Navy, Marine Corps, Defense Logistics Agency and National Guard may also use for purchases, is designed to allow users one-stop shopping for local-area network products and services.

> The contract carries a total potential value of $700 million over eight years.
>
> ▲▲▲

The contract, awarded last July, carries a total potential value of $700 million over eight years. EDS has lined up 59 vendors to supply 450 products for LANs, modems, optical storage devices, word processing and data base software, as well as peripherals. Installation and support are also available under SMC.

In accordance with the Government OSI Profile purchasing mandate, the Defense Department is buying the OSI products to provide interoperability among diverse Unix and MS-DOS computers.

Malcolm White, Retix director of strategic account management, said Prime Computer, Inc.'s Unix-based EXL 320 computer would be supplied as the server component under the contract. A variety of Intel Corp. 80386-based personal computers will be used as clients.

The contract calls for Retix to supply its MH-440 X.400 MHS software, FT-820 FTAM software and VT-720 virtual terminal software to run on the EXL 320. White declined to offer estimates on how much Retix will earn from the SMC agreement. ◘

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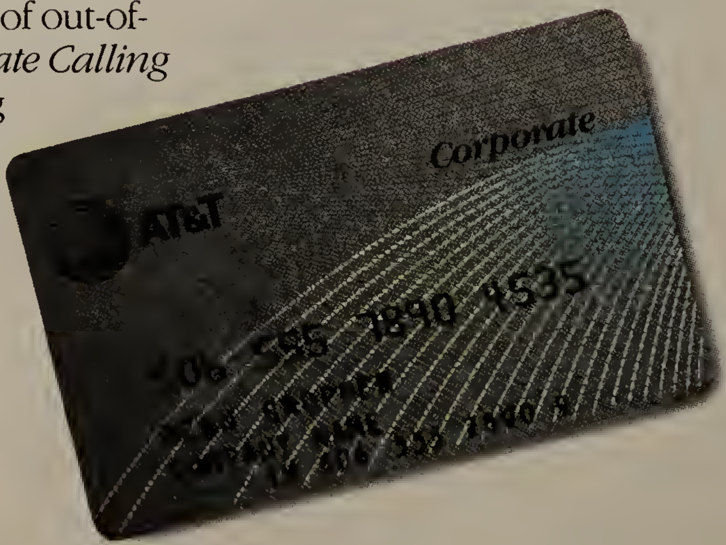

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# TELECOMMUNICATIONS

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## Worth Noting

Boston University is using a voice response system dubbed Telegrade to enable its students to hear their grades. The system received 9,000 calls on its first day of operation, and 24,000 students have used Telegrade since winter break.

## Carrier Watch

**Southern New England Telephone Co. (SNET)** recently announced software it developed for IBM mainframes that will enable carriers to transmit telephone bills to customers via electronic data interchange.

Called SNET Translator 811, the software changes Bell Communications Research's (Bellcore) Magnetic Tape Billing Plan formats into those specified by ANSI's X.12 811 transaction set standard for customer billing.

In contrast to the ANSI 810 transaction set standard, which limits telephone bill transmission to summary information, the 811 Consolidated Service Invoice/Statement standard applies to usage-based toll charges, miscellaneous charges and equipment charges.

The software, developed for internal use at SNET, works on IBM 30XX and 43XX series mainframes.

It costs $100,000, which includes free around-the-clock support in the first three days of use. Technical support after that period costs $175 an hour.

SNET also plans to market personal computer software that will convert the 811 transaction set to user-friendly formats.

The company declined to say when that software will be available, however.

For more information on the new SNET Translator 811, contact SNET at (203) 634-6363. ◻

# Aspect winning converts in competitive ACD mart

Late entrance let firm focus on new technology.

**By Bob Wallace**
Senior Editor

SAN JOSE, Calif. — Start-up Aspect Telecommunications Corp.'s advanced, fully featured automatic call distributor (ACD) and the company's responsiveness to user needs have enabled it to unseat products from market-leading companies at many large accounts.

In the 3-year-old company's latest coup, it beat out ACD market leaders Rockwell International Corp., Teknokron Infoswitch Corp. and Telcom Technologies for a contract from Fidelity Investments, considered by some to have one of the largest call centers in the Northeast.

### String of victories

Aspect has, in fact, won a string of victories during the past six months, including deals with America West Airlines, Inc. and Thrifty Rent-A-Car System, Inc.

Fidelity replaced its Rockwell Galaxy ACD with the Aspect Call Center, which anchors its 300-agent call center in Boston. Patrick Kelly, voice development director for the firm, said Fidelity chose the Call Center because it offered more options in processing calls and included more highly integrated messaging and routing capabilities than other ACDs.

"We can program the Call Center with a long list of what-ifs that tell it how to process calls based on the situation the center is in when the call arrives, [taking into account factors such as] how many calls are waiting, how many agents are available, agent skill levels and the time of day," Kelly said.

The Call Center also integrates voice messaging and supports more recorded announcements than other ACDs. "Some ACDs are limited to playing about 60 recorded announcements to callers, whereas the Call Center can draw from almost 1,000," he noted.

Aspect's willingness to enter into a strategic partnership with Fidelity helped seal the deal. Under strategic partnerships, users select one or two preferred vendors from which they purchase most equipment under multiyear contracts.

In return, customers are ensured the lowest prices, a hand in

(continued on page 14)

## WASHINGTON UPDATE

BY ANITA TAFF

**FCC issues rules for AOS providers.** The Federal Communications Commission last week sought to regulate the alternative operator services (AOS) industry by issuing a proposed set of rules for those providers. The agency was directed to issue the regulations in a bill passed last year, the Telephone Operator Consumer Services Improvement Act of 1990. That bill was introduced by Rep. Jim Cooper (D-Tenn.), a member of the House Telecommunications Subcommittee. Cooper had characterized some AOS companies as rip-off artists and said the regulations were necessary to protect consumers.

Last week, the FCC proposed rules that would require all pay telephones to be capable of providing access to carriers other than the pay phone's presubscribed carrier within one year of the rule's enactment. The agency also proposed that within three years, private branch exchanges in hotels or hospitals be upgraded to enable users to reach the carrier of their choice.

The FCC acknowledged industry complaints that greater carrier access increases the fraud problem associated with pay phones and called for public comment for possible remedies. Pay phone operators, which earn commissions from traffic carried by the presubscribed carriers, have complained that their revenues will diminish once alternative access is mandated. The FCC is asking for comment on whether a compensation method should be instituted.

**AT&T plan gets OK.** AT&T got permission from the Federal Communications Commission last week to proceed with

(continued on page 16)

**Legal history of the FCC's Computer Inquiry proceedings**

| | |
|---|---|
| 1971 | First Computer Inquiry released. Separated services into regulated communications, unregulated data processing and hybrid services. |
| 1980 | Second Computer Inquiry released. Continued regulation of basic services but said enhanced services were outside FCC's jurisdiction; required unbundling of CPE from transmission services and mandated that enhanced services were to be offered through separate subsidiaries. |
| June 1986 | Third Computer Inquiry released. FCC issues Phase I Order eliminating separate subsidiaries for AT&T and RBHCs and instituting accounting and interconnection rules as safeguards. |
| May 1987 | State of California and the California Public Utility Commission appeal Phase I Order to the U.S. Court of Appeals for the 9th Circuit in San Francisco. |
| June 1990 | U.S. Court of Appeals - 9th Circuit overturns Computer III. |
| July 1990 | FCC issues temporary waiver allowing RBHCs to continue offering enhanced services through telephone units. |
| Oct. 1990 | District of Columbia Public Service Commission issues notice that it may begin regulating enhanced service providers. |
| Dec. 1990 | FCC opens proceeding to reinstitute its Open Network Architecture rules. |

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: *NETWORK WORLD*

# FCC urged to block D.C. regulatory move

Users, service providers, industry groups hope to stop PUC from regulating enhanced services.

**By Anita Taff**
Washington Bureau Chief

WASHINGTON, D.C. — Apprehension over an attempt by the Washington, D.C. Public Service Commission (PSC) to regulate enhanced services has grown so high that a group of users, service providers and industry associations has asked the FCC to step in and block the action.

In a recent filing, the group said the Federal Communications Commission has the authority to stop local efforts to regulate enhanced services despite a court ruling last year that said the FCC's Third Computer Inquiry improperly preempted state regulators.

In Computer III, the FCC preempted state authority to regulate enhanced services and imposed a national policy that enhanced service providers should not be regulated at all.

Parties signing the joint petition — 16 in all — to block regulation of enhanced services here included BT Tymnet, Inc., California Bankers Clearing House Association, CompuServe, Inc., Digital Equipment Corp., The Dun & Bradstreet Corp., GE Information Services, IBM, MasterCard International, Inc. and Visa USA, Inc.

Last month, many of the same firms filed comments with the Washington, D.C. PSC opposing the effort to regulate enhanced services ("D.C. tries to regulate enhanced service," *NW*, Jan. 21).

In both filings, the group complained that the PSC's efforts to regulate enhanced services could backfire by slowing the introduction of new services and investment in new technologies, and by diminishing price competition. They also claimed that some firms may decide to artificially restrict the sale of services in jurisdictions, such as the District of Columbia, that regulate enhanced services.

These users and vendors argue that the court ruling does not preclude the FCC from preempting state regulation of enhanced services; it only requires the agency to show that state activities would make it impossible to have a coherent federal policy.

"The FCC could preempt state regulation of [enhanced] services if their interstate and intrastate components are inseparable or if such regulation would necessarily thwart or impede federal policy," the group stated in its filing with the FCC.

But users say there is an even more serious flaw in the Washington, D.C. PSC's proposed regulation. They claim the rules would

(continued on page 15)

## Aspect winning ACD converts

*continued from page 13*

shaping product development and a higher level of service and support than what is provided to other buyers.

"The ability to establish this type of partnership was critical," Kelly said. "Aspect has turned around major feature changes or [new features] for us at times in 30 days. We wanted to have an ACD that we could help develop over the years."

According to Gordon McPherson, president of Incoming Calls Management Institute, an Annapolis, Md., consultancy specializing in call center design and education, the Fidelity contract is a big win for Aspect.

"This is a major coup for Aspect," McPherson said. "Fidelity was a very high-profile Rockwell account. This [win] could open even more doors for Aspect."

Fidelity joins America West as one of the more recent Aspect accounts.

After evaluating ACDs offered by Aspect, AT&T, Northern Telecom, Inc. and Rockwell, America West decided to replace the Rockwell Galaxy ACD at its 200-agent Tempe, Ariz., reservation center with an Aspect Call Center ACD.

Mark Klumb, telecommunications director for America West, said the Call Center was easier to use, offered more features and was smaller than ACDs pitched by other vendors.

"It's a phenomenal product," Klumb said. "And Aspect has been incredibly responsive to our needs and willing to jump through hoops to keep us happy."

The Aspect Call Center has more capacity yet fits into the same space vacated by the previous ACD. The ACD proposed by Rockwell would have required extension of America West's switch room, Klumb added.

Aspect has achieved inroads into the territory of longtime ACD vendors despite the fact that, until recently, it has lacked a high-end system.

The company addressed that deficiency with the introduction of two high-end Call Center models that increase by roughly 50% the number of agents and trunks supported by its previous high-end product. The products are expected to help the company compete more effectively for larger systems business.

The System 600R and 700R support more than 500 agents, and can each handle 100,000 busy-hour call attempts and process 16,000 calls per hour. Aspect now offers 10 models for call centers that handle from a few hundred to more than 100,000 calls per day.

Entering the ACD market later in the game than its chief competitors gives Aspect an important edge because users have changed the way they evaluated ACDs, analysts said.

"In the past, we evaluated ACDs on how quickly they processed calls, where today, we judge them in a number of areas such as message and voice response, and application bridges to computer systems," said Bill Church, managing director of The Center for Telecommunications and Computer Information, Inc., a Madison, N.J., consultancy that designs call centers for Fortune 100 companies.

"Aspect has demonstrated that they fully understand the call center market and the technologies users need," Church said. "By designing their system from the ground up a few years ago, they got a jump on vendors like Rockwell, whose ACDs were designed [long ago] and are based on older technology."

> "This is a major coup for Aspect," McPherson said. "Fidelity was a high-profile Rockwell account."

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Analysts noted that Aspect has enjoyed particular success supplanting Teknokron Infoswitch products because many of Aspect's top executives worked for the firm and are familar with Teknokron Infoswitch's ACD line.

They added, however, that the company still faces an uphill battle to unseat Rockwell Galaxy ACDs at the nation's largest and well-established call centers.

An Aspect executive who requested anonymity said it has sold only five Call Centers to replace Rockwell Galaxy ACDs during the past several years but declined to say how many of its switches have been installed as replacements for Teknokron Infoswitch ACDs.

Thrifty Rent-A-Car is one of a growing number of users that replaced a Teknokron Infoswitch with an Aspect Call Center.

After a six-month comparative analysis of stand-alone and private branch exchange-based ACDs, Gary Johnson, general manager of reservation services for Thrifty Rent-A-Car and a former engineer with Teknokron Infoswitch, selected Aspect's Call Center for the company's 125-agent nationwide reservation center in Tulsa, Okla.

"We thought in the back of our minds that Teknokron [Infoswitch], the incumbent vendor, would be the vendor of choice until we started evaluating each switch piece by piece and analyzed what our call center needed to run as best as it could," Johnson recalled. "Aspect won out strongly over the other vendors."

The Call Center replaced Thrifty's Teknokron Infoswitch ACD and beat out ACDs pitched by AT&T, Rockwell and Rolm Co. ◪

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# AT&T unit offers billing services for hospitals

**By Bob Wallace**
Senior Editor

ANN ARBOR, Mich. — AT&T College and University Systems (ATTCUS) last week introduced a telecommunications service for hospitals that enables the carrier to assume patient billing, customer service, bill collection and management report creation from its headquarters here.

"Hospitals save by not having trained personnel handle patient billing and inquiries," said Tom Fales, director of ATTCUS' health care marketing unit. "This frees the hospitals to spend more time on patient care."

Patients who check in to hospitals using the Patient Telephone Service are assigned a personal security code that enables them to place long-distance calls during their stay.

An AT&T 3B2 minicomputer polls hospital station message detail recording (SMDR) units each evening and charges the calls according to a rate schedule preset by the hospital. Any private branch exchange with an SMDR unit can support Patient Calling Service, Fales said.

The code is deactivated when the patients leave. ATTCUS prepares and sends the bill to the patient's home and management reports to the hospital. ATTCUS agents here handle all customer service inquiries.

> "Hospitals save by not having trained personnel handle patient billing and inquiries."

▲▲▲

ATTCUS developed Patient Billing Service with Lutheran General Hospital in Chicago.

"This service has helped us improve patient satisfaction while giving our patients significant cost savings during their stay," said Gary Horn, director of communications engineering for the 750-bed facility. "Our hospital also saves administrative costs because all billing and customer services are handled by AT&T."

The hospital had experienced billing problems with the alternative operator services (AOS) it used before AT&T's offering.

"We had instances where patients got home and received $600 telephone bills, and you can imagine the type of response we got from that," Horn said. "We were, as a goodwill gesture, paying patients' telephone bills out of our pocket."

AOS rates were also high, a situation that encouraged the hospital to apply the 20% commission it received to the cost of telephone calls. "We weren't making any money, and we were still receiving complaints," Horn said.

To make matters worse, patients assumed that the AOS operators, who were often rude to patients, were Lutheran Hospital employees. "The view of the patient was, 'They have rude operators that don't want to take the time to help me.' "

AOS operators also did not always verify third-party calls, Horn said. The use of Patient Calling Service security codes has reduced toll fraud, he noted. ◪

# FCC urged to block move

*continued from page 13*

apply to a host of firms using the public network to provide services, even corporations not considered to be carriers.

For example, financial institutions that rely heavily on network services to support automated teller machines and remote credit card authorizations could be affected under the proposed regulation. Traditionally, local regulators have had jurisdiction only over utilities and telephone carriers.

FCC officials have also expressed alarm at the possibility of 51 different sets of regulations governing enhanced services in the 50 states and the District of Columbia.

In December, the agency opened a proceeding attempting to reinstate many of the rules it put forth in Computer III. In that proposal, the FCC sought to take back much of the jurisdiction over enhanced services provided by carriers.

However, the FCC did not specifically address the question of regulating network services provided by companies that are not carriers. The joint petition filed by the 16 parties is a more direct attempt to have the FCC address the situation in the District of Columbia before the states decide to impose their own regulation.

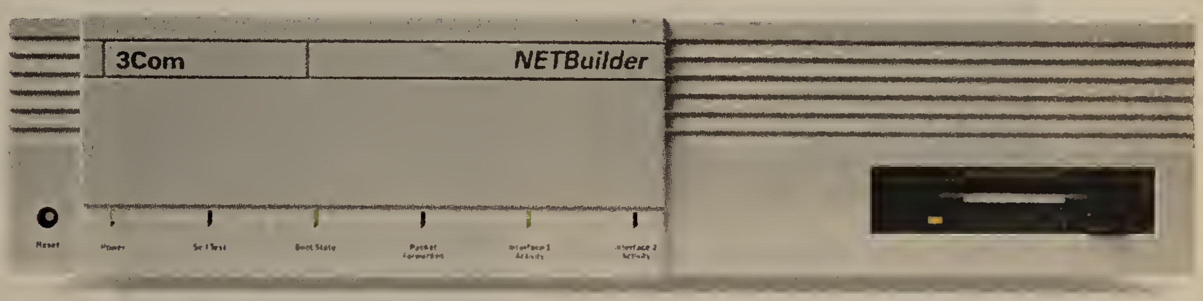
The group pointed out that many enhanced services are provided on a nationwide basis. "In order to be economically viable, these services must be able to introduce or revise offerings rapidly in response to changing technological developments, market conditions and user needs," they said.

"Making such changes would not be possible, however, if the providers of these services are required to obtain advance approval from numerous state regulatory authorities and comply with a myriad of inconsistent state regulations."

The joint petition stated that regulating enhanced services will add yet another risk factor for fledgling firms and may scare some away from providing service in jurisdictions with local regulations.

Some sources said the FCC might move quickly on the group's petition since it is complementary to the proceeding the commission has opened to reinstate many of the rules established in Computer III. ◪

Ch Changes.



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# AT&T files 15th Tariff 15 custom net arrangement

**By Anita Taff**
Washington Bureau Chief

WASHINGTON, D.C. — Despite the virtual certainty that the customer will have to wait nine months for service, AT&T recently filed its 15th Tariff 15 deal — this one for Thomson Communication Services, a publishing company in New York.

AT&T is offering the firm a 10% discount off the total monthly charges for Software-Defined Network (SDN) Service Expanded Volume Plan, Megacom 800, Basic 800 and AT&T 800 Readyline. In order to receive the discount, Thomson had to commit to a minimum of 15 million minutes of SDN traffic per year for two years.

AT&T told the Federal Communications Commission that its offer is in response to a similar deal US Sprint Communications Co. made to Thomson. AT&T claims US Sprint is offering a package of its Virtual Private Network, Ultra 800 and Fonline 800 services for a two-year term at rates signficantly lower than its tariffs.

The FCC has taken up the issue of Tariff 15 numerous times but has never reached a decision on whether the deals are lawful. The agency has a well-established pattern now of holding up Tariff 15 deals for the maximum time allowed — recently raised from 90 days to 120 days by Congress — and then suspending them for an additional five months while it conducts an investigation.

Tariff 15 is controversial because it allows AT&T to single out specific customers for discounts in response to competitors' offerings — an activity that usually might be considered illegal.

Provisions of the Communications Act of 1934 bar carriers from discriminating between customers in rates, terms or conditions.

It is likely that opponents of Tariff 15 will once again raise this issue in challenges to the deal. But this offering may also have another legal hurdle to cross. This is the first Tariff 15 deal that offers discounts on more than one type of service.

This deal closely resembles a tariff AT&T filed last year that was rejected by the FCC as unlawful. That filing would have given users a discount on combined usage of 800 and SDN services. The FCC ruled that because AT&T has a dominant position in the 800 services market, such a discount would unfairly allow AT&T to leverage that dominance to sell SDN services.

AT&T will likely use the same defense for this Tariff 15 offering as it has for others: a legal concept known as competitive necessity. AT&T claims there is legal precedent to justify allowing it to offer off-tariff deals in order to counter such deals from rivals.

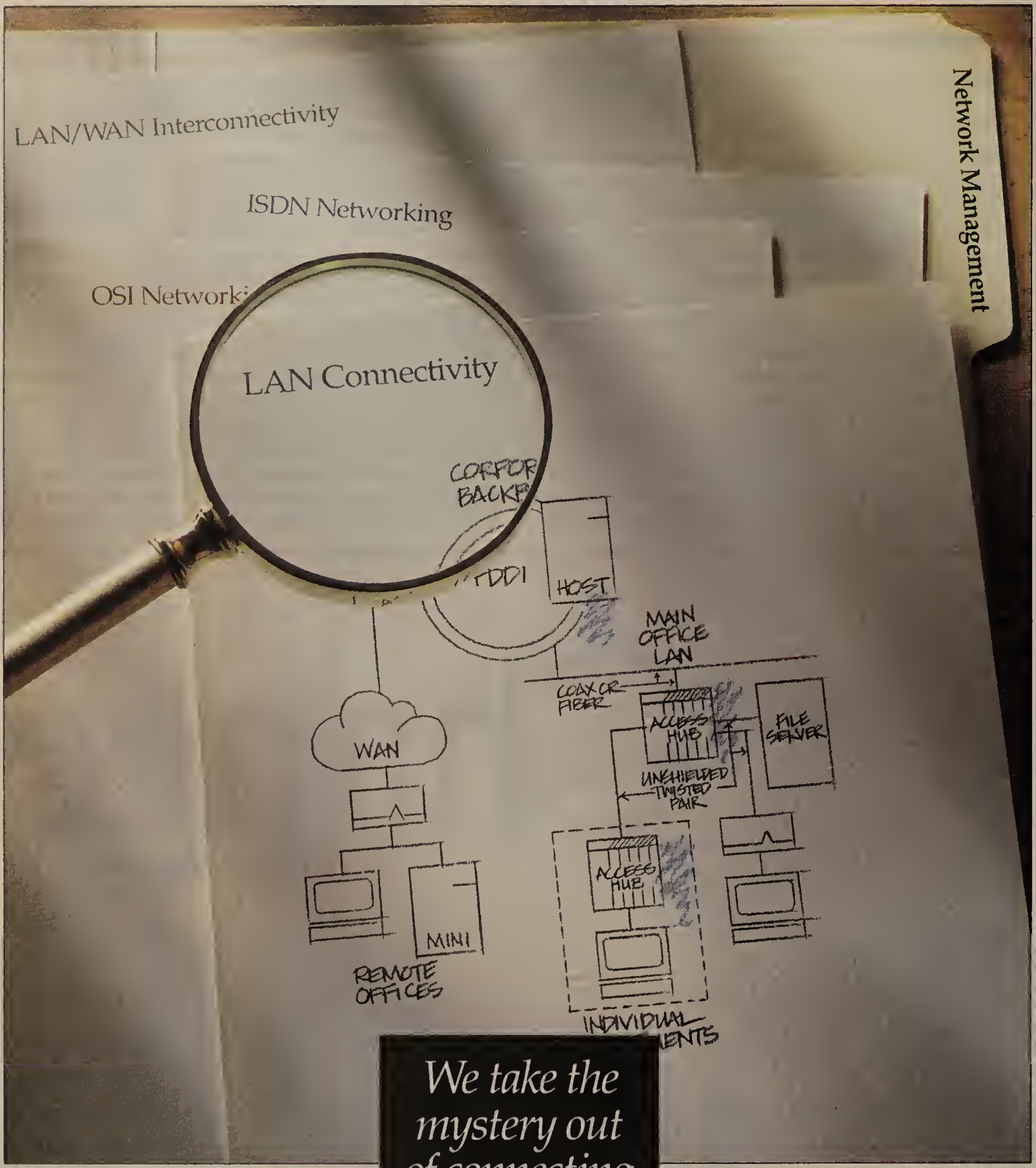
Observers speculate that AT&T may be trying an end run around the FCC's rules by offering a combined discount in a tariff that allows AT&T freedom to sell its services in a manner that would normally be illegal. ◘

## Washington Update

*continued from page 13*

several modifications to its Multi-Location Calling Plan (MLCP). The plan, which allows customers to receive volume discounts based on traffic from a number of locations and multiple services, had been used by aggregators to resell AT&T services. The modifications AT&T filed restructure the available discounts under MLCP and change provisions that dictate termination charges.

Mid-Com Consultants, Inc., an aggregator of AT&T services, filed a petition against the proposed changes claiming they discriminate against users who wanted to buy service from aggregators. AT&T later withdrew the language that would have affected aggregators the most. ◘



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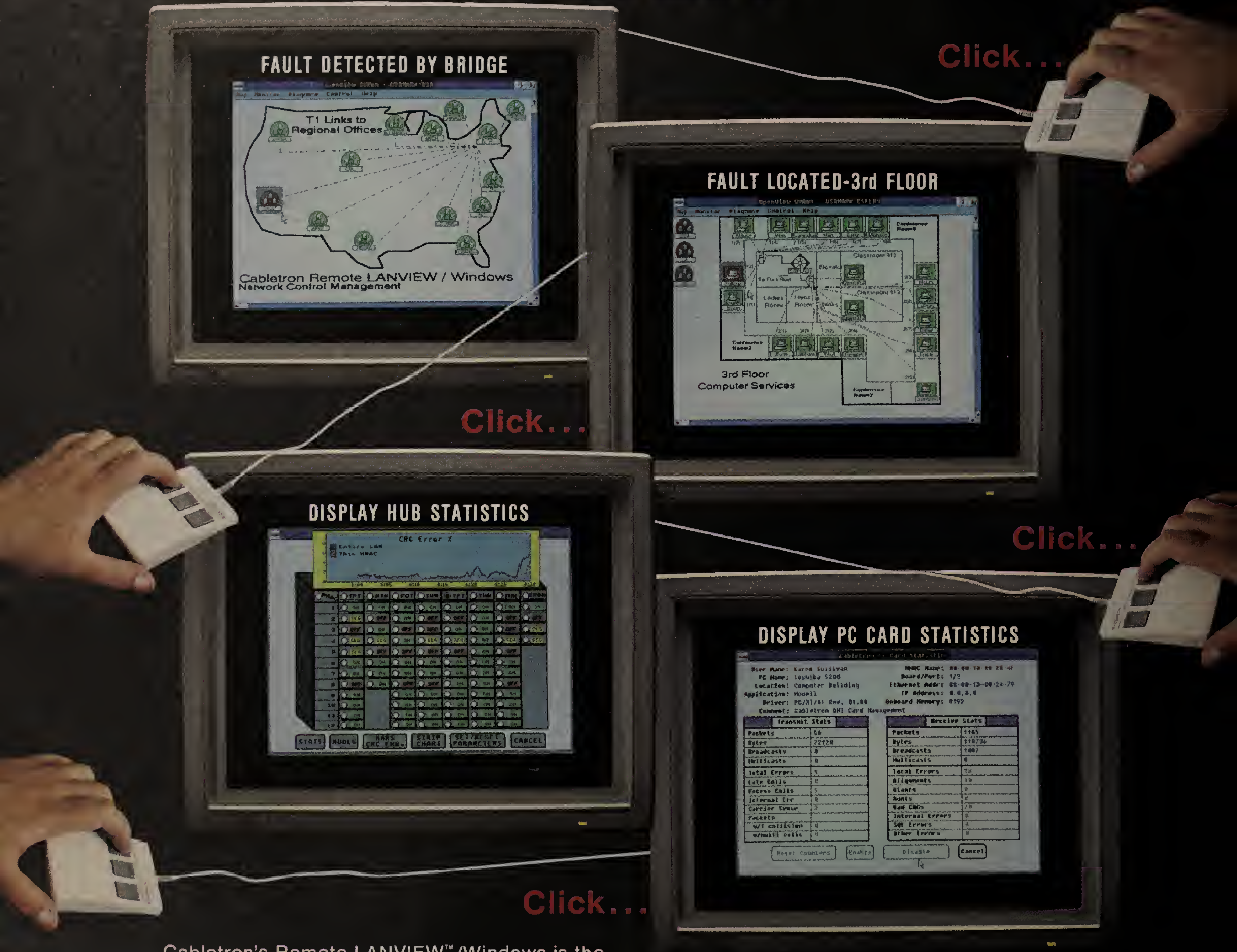

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# DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

## Worth Noting

In 1988, there were 29,230 IBM Systems Network Architecture nets installed worldwide. By 1994, that figure is expected to grow to 38,000, according to "Network Management — A Growing Priority for Communications Networks," a report by International Data Corp. of Framingham, Mass.

## Data Packets

**Retix** last week introduced a low-end bridge/router that will link remote local-area networks over T-1 circuits.

In addition to supporting point-to-point traffic between two LANs, the 4941 Remote Bridge/Router can act as a feeder that transmits traffic to larger Retix 4942 Bridge/Routers capable of passing traffic between multiple LANs.

As a router, the device only forwards Transmission Control Protocol/Internet Protocol traffic destined for a remote node across the wide-area link. For non-TCP/IP traffic, the device acts as a LAN bridge that broadcasts most LAN traffic, including traffic destined for local nodes, across the wide-area link.

When acting as a bridge, the device supports the Spanning Tree Protocol, which prevents traffic from continually traversing the network if the target system has failed. It also includes a media access control filter that enables users to prevent traffic generated by certain LAN interface boards from being passed over the wide-area circuit.

The 4941 Remote Bridge/Router supports a single Ethernet or thin-wire Ethernet port and a single wide-area port with either a V.35, X.21, RS-449, RS-232 or T-1 interface.

*(continued on page 20)*

### Multiequipment net management players

| **Vendor**<br>Product | **Host Interfaces** | **Multivendor capabilities** |
|---|---|---|
| **AT&T Paradyne**<br>Comsphere 6800 Series | Current: NetView, UNMA | Terminal emulation |
| **Codex Corp.**<br>9800 Network Management System | Current: NetView<br>Future: UNMA, EMA | Full integration |
| **Data Switch Corp.**<br>TotalNet | Current: NetView, UNMA | Operational integration |
| **General DataComm, Inc.**<br>MegaView | Current: NetView, UNMA<br>Future: EMA | Terminal emulation |
| **Infotron Systems Corp.**<br>Streamline Network Management System | Current: NetView, UNMA | Terminal emulation |
| **Memotec Data, Inc.**<br>Network Information System Series | Current: NetView | Terminal emulation |
| **Racal-Milgo**<br>Communications Management Series 6000 | Current: NetView<br>Future: UNMA, EMA | Operational integration |

Use of multiequipment net management systems, which manage multiple element managers, is expected to grow rapidly in coming years. The above systems offer some type of graphical interface and run under Unix.

**EMA = Digital Equipment Corp.'s Enterprise Management Architecture**
**UNMA = AT&T's Unified Network Management Architecture**
**Operational integration = Integrated alarm reporting and control over managed objects**
**Full integration = Same as operational integration, plus a bidirectional link to an integrated net management system**

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

# New net mgmt. approach winning fans among users

### Study says three-tiered method gaining popularity.

**By Paul Desmond**
Senior Editor

FRAMINGHAM, Mass. — A market research firm here is predicting rapid growth for an emerging breed of network management tools that consolidate management of product-specific control systems and feed information into larger integrated net management systems.

According to a recent International Data Corp. (IDC) report, an increasing number of users are adopting a three-tiered approach to network management, which includes element management tools for devices such as modems and multiplexers, so-called multiequipment net management systems and integrated network management products.

Multiequipment network management systems can monitor and control a number of element management tools and can hand information off to a larger integrated network management system.

Ginny Mellinger, IDC market analyst and author of the report, said multiequipment systems filter alarms from element managers to limit the amount of data sent to integrated management systems such as IBM's NetView or AT&T's Accumaster Integrator. They will also provide a single point of control for functions such as reconfiguring network elements, including modems or T-1 multiplexers, that are not yet supported on integrated systems.

"At the integrated [management system] level, you're going to see a lot of the administrative and inventory-type functions on a networkwide level being done," Mellinger said. "But you're still going to have to window down to subsystems — be they an element management system or a multiequipment system — to do the actual management of the elements in the network."

The market for multiequipment systems is immature today: Most systems were introduced within the last two years, including AT&T Paradyne's Comsphere 6800 and General DataComm, Inc.'s (GDC) MegaView. But IDC projects a strong 30.4% compound annual growth rate in the multiequipment network management market through 1994.

> Multiequipment systems can control a number of element management tools.
>
> ▲▲▲

The IDC report mentions multiequipment management systems from seven vendors (see graphic, this page), although it discusses only five in depth. Fea-

*(continued on page 20)*

# New York Life girds net against disaster

### Life insurance company uses diverse routing, redundant circuits to protect net from outages.

**By Wayne Eckerson**
Senior Editor

NEW YORK — Knowing the importance of preparing for disaster, New York Life Insurance Co. has developed a fully redundant nationwide network that offers plenty of insurance against unexpected service outages and network equipment failures.

The $46 billion financial services firm began preparing its disaster recovery plan three years ago after a mandate from then Vice-Chairman Harry Hohn to identify all single points of failure and find ways to eliminate them.

"Three years ago, we were a typical user that relied on a single carrier for our long-haul traffic and didn't inquire about routing," said Paul Coleman, who heads the disaster recovery effort at New York Life. "That's all changed now."

Today, among other things, New York Life splits its long-distance traffic between AT&T and MCI Communications Corp. and uses diverse routing and redundant circuits to protect against a failure in its backbone network.

It has also arranged for local exchange carriers to provide alternate routing from multiple central offices serving its two primary locations: corporate headquarters in midtown Manhattan

*(continued on page 23)*

### New York Life's net redundancy strategies

**Premise (for headquarters and data center):**
- 2 cable entrance points
- 2 conduits carrying cable
- 2 wiring closets

**Local access (for headquarters and data center):**
- Separate fiber routes to 2 or more central offices

**Long haul:**
- 56K bit/sec dedicated circuits from MCI Communications Corp.
- Automatic rerouting around failed circuits for immediate backup
- Switched 56K bit/sec circuits from AT&T for extended backup

**Network nodes:**
- Dial backup from branch offices to data center is automatically initiated when a node fails.

SOURCE: NEW YORK LIFE INSURANCE CO., NEW YORK
GRAPHIC BY SUSAN J. CHAMPENY

# *United Stationers signs bulk plan with US Sprint*

**By Jim Brown**
Senior Editor

DES PLAINES, Ill. — United Stationers, Inc. last week confirmed that it signed a three-year, multimillion-dollar custom voice and data network contract with US Sprint Communications Co.

United Stationers rejected an AT&T Tariff 12 proposal and an MCI Communications Corp. custom network arrangement in favor of US Sprint's Bulk Services Agreement. "We let the Big Three put on the gloves and fight it out," said Jim Kolbe, director of telecommunications at the firm.

Under the contract, US Sprint will provide United Stationers with the same mix of services it now obtains from AT&T but at a lower cost, Kolbe said. In fact, US Sprint's pricing structure enables United Stationers to expand use of strategic applications, including an 800 service that small-volume dealers can use to dial into an IBM host and enter orders.

"We've increased functionality on the network and reduced expenses by 8% to 10%," Kolbe said, though he declined to reveal the contract value.

Also under the agreement, US Sprint will provide 2,400, 4.8K and 9.6K bit/sec leased multidrop circuits to enable United Stationers' larger dealers to enter orders from on-site terminals or microcomputers. United Stationers currently uses AT&T multidrop circuits for this application.

US Sprint T-1 and 64K bit/sec data circuits will replace AT&T facilities to interconnect StrataCom, Inc. IPX T-1 multiplexers in the office product wholesaler's 16 locations nationwide. Those T-1 multiplexers support IBM Systems Network Architecture traffic between the data center here and regional distribution centers. ◼

## Data Packets

*continued from page 19*

The 4941 Remote Bridge/Router costs $6,250 and is available now.

**Newport Systems Solutions, Inc.** last week introduced a router capable of passing traffic between remote Novell, Inc. NetWare local-area networks over circuits operating at between 9.6K bit/sec and fractional T-1 speeds of 768K bit/sec.

The LAN²LAN/768 can establish point-to-point connections between NetWare-based LANs.

Alternatively, it can route NetWare traffic between multiple LANs over X.25 packet-switching links.

The LAN²LAN/768 supports a token ring, Arcnet or Ethernet and two wide-area ports with RS-232, V.35, RS-422 or X.21 interfaces. The LAN²LAN/768 is expected to ship next month and is priced at $2,695.

**Hewlett-Packard Co.** and **Science Applications International Corp. (SAIC)** last week said they will jointly introduce a version of HP's Task Broker software for Sun Microsystems, Inc. workstations running the Unix-based Sun/OS 4.03 or above. The software will enable a Sun workstation-based application to off-load a CPU-intensive task to a more powerful processor attached to the same Transmission Control Protocol/Internet Protocol network. The software is currently available for HP's line of workstations running HP-UX, its version of Unix.

Task Broker must run on each system in the CPU sharing arrangement. A user looking to off-load a processing task would broadcast a request on the network. Each of the other systems running Task Broker would respond with a message detailing how long it would take to complete the task and when it could perform the task. The user can then select which system to use or allow Task Broker to automatically make the selection.

The Sun version of Task Broker will be available in June and will be sold by both HP and SAIC.

A license to run the software on 10 Sun workstations will cost $5,000.

**AT&T** last week said **France Telecom** will distribute AT&T's Accumaster Integrator network management software in France.

Telesystemes, a subsidiary of France Telecom, will work with AT&T Paradyne to install the software at user sites in France. Accumaster Integrator merges network management data from a series of disparate systems into a single map that is displayed on a workstation screen.

The agreement can assist companies with networks in France and the U.S. by enabling them to deploy the same software in both countries. Users can interconnect the Accumaster Integrators to enable the U.S.- and France-based management systems to exchange information. ▣

## Net mgmt. approach winning fans

*continued from page 19*

tures of Memotec Data, Inc. and Data Switch Corp. products are not discussed in the report.

The report repeatedly singles out Codex Corp.'s 9800 Network Management System and Racal-Milgo's Communications Management Series 6000 as being at the head of the pack in functionality. In an interview, Mellinger said Data Switch's TotalNet is also fairly sophisticated.

Those products all have what the report dubs an operational level of integration. That means they integrate alarm reporting and control over multiple element management systems on a single-user console.

Codex is the only vendor to achieve full integration, Mellinger said. Full integration adds the ability for an integrated management system — NetView, in Codex's case — to monitor and control the multi-equipment system without resorting to terminal emulation.

GDC recently announced MegaView enhancements that promise to give NetView operators limited control over MegaView using native NetView commands.

Although all systems for managing multiple equipment were designed to support the management of one vendor's element management system, most are now being enhanced to support links to other third-party element management systems and to integrated systems. Virtually all vendors are promising to support Open Systems Interconnection protocols, which will be required, according to the report.

"Proprietary approaches to network management, while still common, will not survive beyond the mid-1990s," the report stated.

In the interim, the report singles out Codex and Racal-Milgo for developing direct interfaces to third-party management systems. For example, Release 3 of Codex's 9800 will let that system collect event and alarm messages from any non-Codex product that has an RS-232 port.

GDC's MegaView also supports management of third-party element management systems if they support a link to AT&T's Integrator, the report stated. GDC offers a translation product to reformat non-GDC alarms.

The report, titled "Network Management — A Growing Priority for Communications Networks," discusses an array of management systems from numerous vendors. Included are sections on performance measurement systems, plus X.25, T-1 and integrated management systems. ▣

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The East-West Education Development Foundation, a not-for-profit foundation, is seeking donations of surplus personal computers and peripherals for placement in educational institutions in the USSR and Eastern Europe. The goal of the Foundation is to introduce information technology into the educational system of those countries evolving toward a democratic, free market society. By educating the students on the power of information technology, they will be better equipped to compete in the global market of tomorrow.

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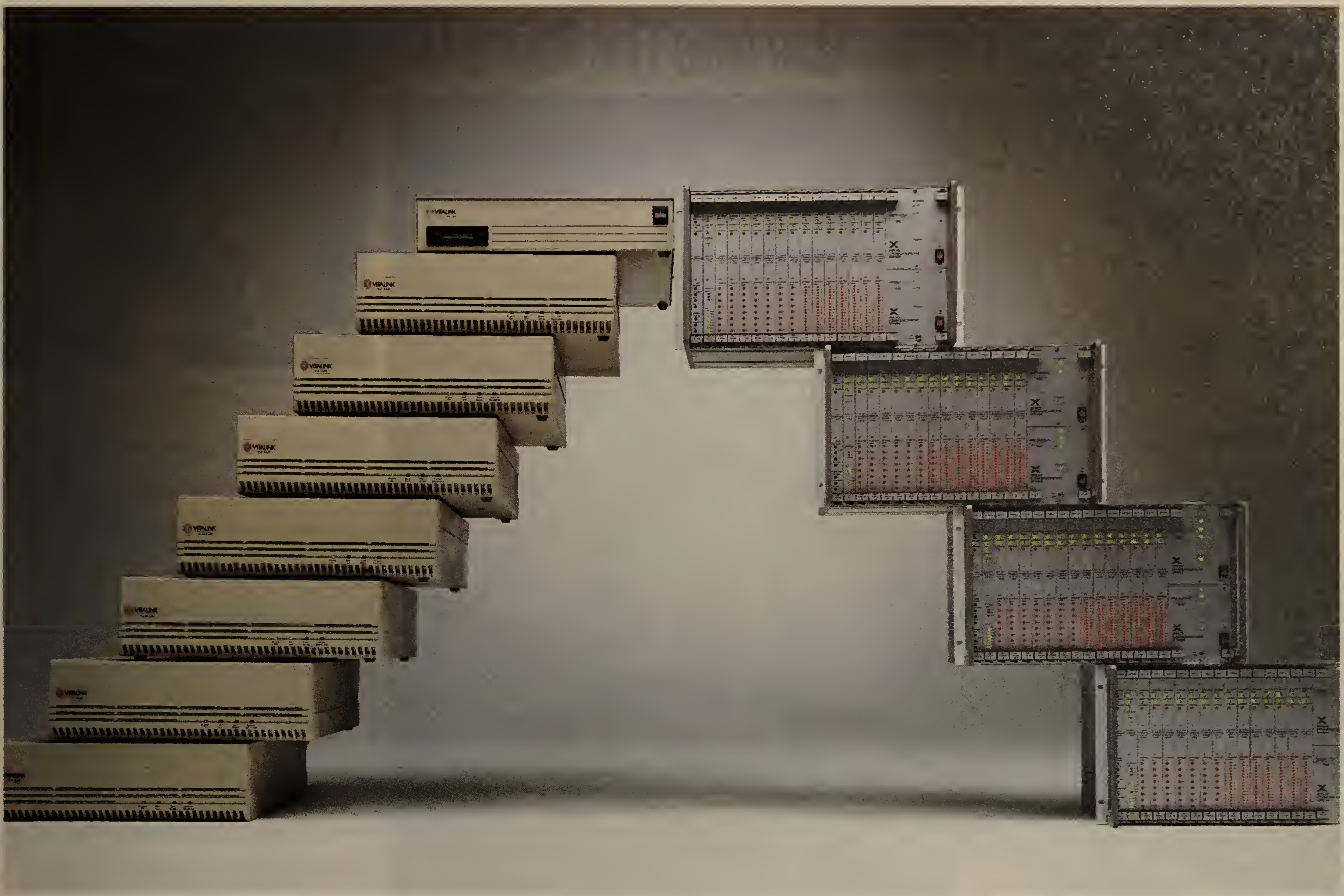

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# New York Life girds net against disaster

*continued from page 19*

and its data center in Clinton, N.J.

"Today, we regularly review network routing with our carriers and continually update the company's contingency procedures as new products and services come on the market," Coleman said.

New York Life uses 56K bit/sec lines to connect six backbone nodes to its New Jersey data center and eight T-1 lines between the data center and corporate headquarters, which also houses a backup data center. The firm's 270 branch offices are connected to backbone nodes via 19.2K or 9.6K bit/sec multidrop lines.

Coleman began the disaster recovery effort by looking for single points of failure in four main areas: premises facilities, the local loop, long-haul circuits and backbone nodes (see graphic, page 19).

In premises locations, Coleman recognized that the vulnerable points included the wiring closet, cable conduit and cable entrance into the firm's data center and headquarters building. An outage at one of these points would seriously disrupt companywide communications, Coleman said.

To eliminate these single points of failure, New York Life built an extra wiring closet at each site. All of the closets are now fed by separate cable conduits that enter the buildings at different locations.

In the local loop, Coleman petitioned New York Telephone Co. and United Telephone Systems, Inc., an independent local exchange carrier serving the Clinton area, to provide alternate routing through two central offices. Coleman wanted this service for New York Life's headquarters and data center locations.

Howard Maroney, corporate vice-president of telecommunications planning, said it took considerable negotiations with the carriers to settle on an acceptable price for building alternate fiber routes to the sites.

A spokesman at New York Telephone said the carrier has offered alternate routing of private lines from two serving offices since the early 1980s but few companies have agreed to pay the construction costs associated with the service.

Today, these two New York Life sites are each linked by fiber lines to two central offices. The fiber lines are terminated at each end by a local exchange carrier-owned fiber multiplexer, which automatically routes data around a failed local loop circuit or downed central office.

"This alternate routing protects us from disasters like Hinsdale," said Maroney, referring to the 1988 fire in an Illinois Bell Telephone Co. central office that caused widespread network outages in the Chicago area.

Besides obtaining alternate routing from local carriers, New York Life uses local access service from alternative carrier New York Teleport.

To identify single points of failure on the backbone network, Coleman drew up a huge map on which he plotted the routing configuration of every New York Life circuit. The map enabled Coleman to see if circuits passed through the same central office or shared space in the same conduit.

"You can't really grasp where circuits are going and whether there is overlap unless you plot it on a map," Maroney said.

But obtaining exact routing configurations from carriers was not easy. Initially, Coleman was told that the firm's circuits passed through 50 different serving offices. However, after further prodding, he discovered that there were more than 200 serving offices involved in handling New York Life's backbone traffic.

Coleman's map revealed that there was one secondary serving office in Newark, N.J., through which most of the company's circuits passed. An outage in that office would have crippled New York Life's entire network, Coleman said.

To diversify the backbone network, Coleman decided to lease 56K bit/sec dedicated lines from MCI and use switched 56K bit/sec service from AT&T to back up the MCI circuits.

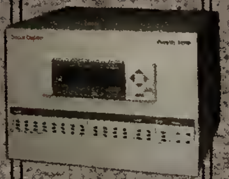
He also decided to link each network node to one other node via a 19.2K bit/sec circuit used for backup purposes only. When a circuit goes down, the network node reroutes traffic across the 19.2K bit/sec link to its sister node, which then sends the data to the New Jersey hub. This provides uninterrupted service to New York Life users, Coleman said.

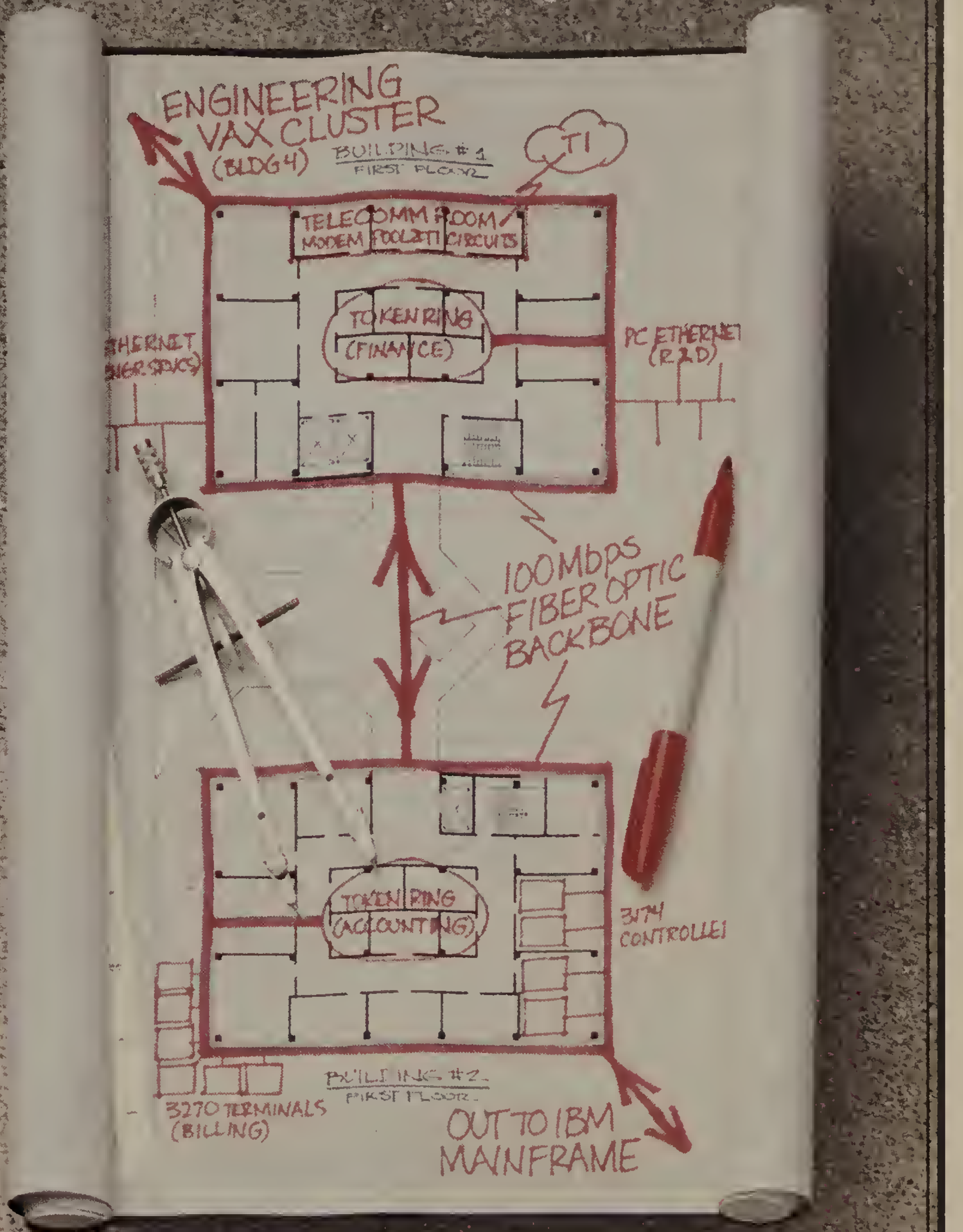
Shortly after a line goes down, New York Life calls AT&T to activate the switched 56K bit/sec service, which takes a few minutes to come on-line. Once it does, traffic is rerouted from the 19.2K bit/sec link to the switched service.

New York Life has also built in considerable route diversity between its data center and headquarters, which is heavily trafficked. The two sites are connected by eight T-1 circuits, four of which are leased from AT&T and four from MCI. Each T-1 is terminated at a pair of Codex Corp. T-1 multiplexers. If service from either of the carriers is interrupted, the multiplexers can reroute traffic across the other carrier's circuits.

Finally, in case a network node fails, the New Jersey data center is programmed to automatically initiate dial backup to every branch location served by the downed node, Coleman said.

Maroney said the up-front costs of the project were $200,000, most of which was spent building new wiring closets and adding new cable conduits in New York Life buildings. The program's recurring costs, which cover equipment maintenance and usage charges, are $50,000 a year, he said. ◼





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# LOCAL NETWORKING

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## Worth Noting

> "We think the architecture of OS/2 3.0 will be the networking architecture of the future."
>
> **Russell Siegelman**
> Product manager
> Microsoft Corp.'s
> network business unit
> Redmond, Wash.

## Netnotes

**Madge Networks, Inc.** last week introduced its second-generation token-ring management tool at the NetWorld '91 Boston conference.

According to San Jose, Calif.-based Madge Networks, Ring Manager II manages and controls multiple token-ring local-area networks connected by source routing bridges.

Ring Manager II runs on any personal computer in the network and can be used to monitor and isolate errors, trace network usage, inventory network nodes and manage the bridges connecting the rings.

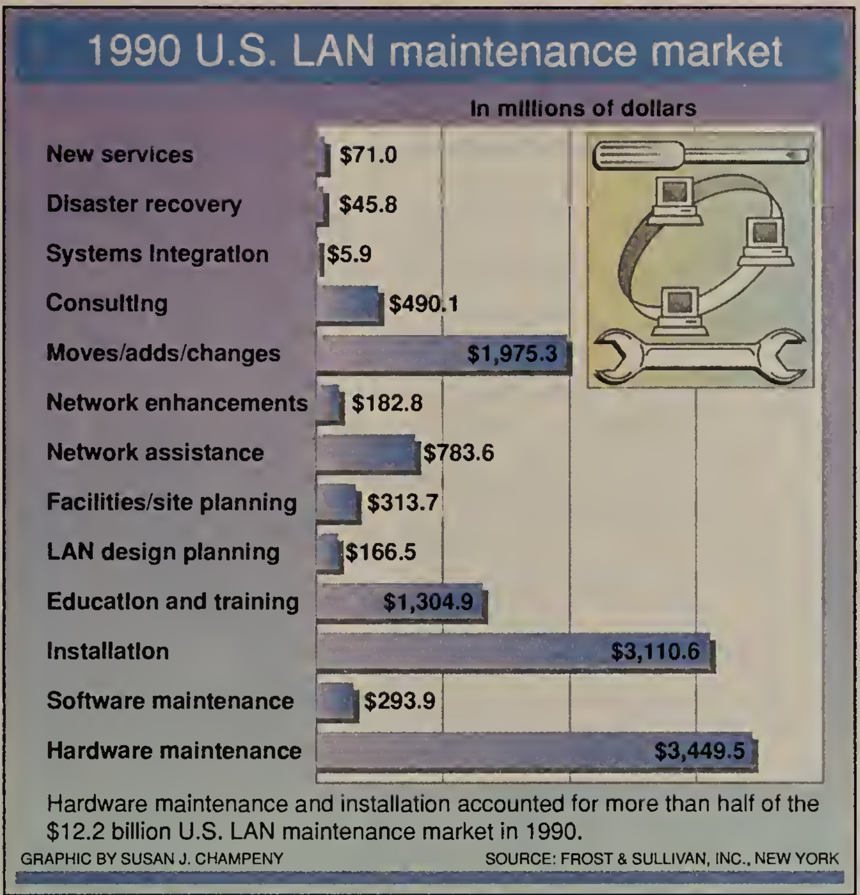
Ring Manager II is expected to be available in April for $3,195.

**AT&T Computer Systems** has added new management capabilities and IBM Systems Network Architecture connectivity options to its StarGroup SNA Gateway, StarGroup LAN Manager Server and AT&T Host Connectivity Series Software.

The SNA gateway, along with the AT&T Host Connectivity Software series, can now support X.25 using the Qualified Logical Link Control protocol, 16M bit/sec token-rings and multiple hosts from a single SNA Gateway.

Gateway users will be able to access SNA hosts using Synchronous Data Link Control links at speeds up to 56K bit/sec, X.25 links at up to 56K bit/sec and token-ring nets at either 4M or 16M bit/sec.

The new StarGroup SNA Gateway release, expected to be available in April, ranges in price from $200 to $5,000. ☐



Hardware maintenance and installation accounted for more than half of the $12.2 billion U.S. LAN maintenance market in 1990.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: FROST & SULLIVAN, INC., NEW YORK

# HLS adds token-ring, net mgmt. support to ProLINC

Now supports IBM DLC for Token-Ring Nets.

By Caryn Gillooly
Senior Editor

MOUNTAIN VIEW, Calif. — Hughes LAN Systems recently announced Version 2.0 of its ProLINC LAN connectivity software, an enhanced product that adds support for IBM Token-Ring Networks and network management capabilities.

ProLINC is software designed to let DOS-based personal computer users access network-attached resources supporting different network protocols.

> New with this version of ProLINC is support for the Simple Network Management Protocol.
>
> ▲▲▲

The ProLINC package combines support for Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Local Area Transport (LAT), Novell, Inc.'s Internetwork Packet Exchange (IPX), Banyan Systems, Inc.'s IPC, Sun Microsystems, Inc.'s Network File System (NFS) and now IBM's Data Link Control (DLC) protocol, which is used in token-ring environments.

According to Kimble Jarrold, associate director of field marketing for Hughes LAN Systems here, ProLINC enables customers to use, for example, IPX protocols to access a Novell server one minute and LAT protocols to tap into a DEC VAX the next.

Each protocol is supported by Hughes LAN Systems' multiprotocol driver, which provides the interface to the network adapter in the user's personal computer.

The new version of ProLINC adds support for IBM's DLC protocol, enabling the product to be used in full-fledged IBM Token-Ring Networks. ProLINC was formerly relegated primarily to Ethernet environments.

The DLC and token-ring support, Jarrold said, will allow users to run IBM's LU 6.2 3270 terminal-emulation software on top of DLC, for example.

Also new with this version is support for the Simple Network Management Protocol (SNMP). SNMP support will make the personal computer supporting ProLINC an SNMP agent capable of being managed by remote SNMP management stations.

To aid in conserving memory in the personal computer, ProLINC lets users load and unload protocols at random without rebooting the system, Jarrold said.

Tom Andrego, a network analyst at Honeywell, Inc.'s Defense Avionics Systems Division in Albuquerque, N.M., said he bought the software to run TCP/IP with 3Com Corp. local-area networks and to connect to NFS- and LAT-based networks.

*(continued on page 28)*

# Hayes LAN designed to be simple to use

LANstep, based on technology bought from Waterloo, supports up to 128 network nodes.

By Eric Smalley
Senior Editor

BOSTON — Hayes Microcomputer Products, Inc. last week introduced at the Networld '91 Boston trade show here a low-end local-area network operating system based on technology purchased from Waterloo Microsystems, Inc.

Hayes, best known for its modem product line, is targeting the LANstep network operating system at small sites that have not implemented networks, according to company President Dennis Hayes.

"LANstep lowers the threshold of sophistication necessary for the successful use of LANs," Hayes said.

LANstep supports as many as 128 simultaneous users of DOS or Microsoft Corp. Microsoft Windows on an Ethernet or Arcnet network. It features an intuitive user interface that is based on a room-and-door metaphor and a facility for easy installation of applications. The LAN operating system also comes with an electronic mail facility called LANstep Mail.

LANstep prompts users to perform routine maintenance, such as backing up files, according to Hayes. This eliminates the need for a full-time network manager and allows users familiar with DOS to run the network, he said.

"[Hayes] has attempted to make it as easy as possible for users to manage a network. It's very easy and intuitive," said Shirley Hunt, an analyst with Dataquest, Inc., a San Jose, Calif.-based market research firm.

LANstep is a peer-to-peer network that does not require a dedicated server. Each workstation's resources can be shared across the network. However, it also has centralized management and directory services, according to Hayes officials.

LANstep supports Microsoft Corp.'s Network Driver Interface Specification standard for adapter card device drivers and has a Network Basic I/O System emulator for running applications

*(continued on page 28)*

# *LANSystems unveils print services for LAN Manager*

By Caryn Gillooly
Senior Editor

BOSTON — LANSystems, Inc. last week introduced its latest print services product, LANSpool for LAN Manager, at NetWorld '91 Boston here.

Like the company's existing LANSpool 2.0 for Novell, Inc. NetWare-based local-area networks, LANSpool for LAN Manager lets a user put a printer virtually anywhere on a network, either dedicating one personal computer as a print server or connecting a printer to any personal computer on the network.

Print services have always been a problem for NetWare customers, as the operating system only supports direct attachment of printers to the server. Many users with expansive networks or with networks in which the server was located in a wiring closet or a management center turned to LANSystems' first LANSpool product for NetWare nets.

Alex Perez, information specialist at Southeast Bank, NA in Miami was one of the beta sites for the original LANSpool. "We use 23 floors of a 55-story building. We have six servers, each with LANSpool, and 300 printers," he said. "If not for LANSpool, we wouldn't have a network in this building."

Although Southeast Bank does not have plans to implement LAN Manager, Perez said, "if LANSpool [for LAN Manager] is anything like the version for NetWare, it's a must buy."

Christine Bach, data communications analyst for Abbott Laboratories/Alternative Care Diagnostics Division in Irving, Texas, is running 3Com Corp.'s 3+Open LAN Manager version and is beta-testing LANSpool for LAN Manager.

According to Bach, LAN Manager is also lacking in print services. Although the operating system lets the user dedicate a workstation as a print server, it must be a diskless workstation and support only two printers.

*(continued on page 28)*

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## Hayes LAN designed to be simple

*continued from page 25*

that support NETBIOS, according to Joe Fuller, director of development at Hayes. The software can be used with older model personal computers, including 8088-based machines, according to Hayes.

LANstep has a "delivery door" mechanism that integrates applications into the operating system rather than loading them on top, according to Hayes. That makes it easier for users to access applications through the LANstep interface.

For more sophisticated users, LANstep can be operated from a command line or through Microsoft Windows.

When Microsoft Windows is used as the native interface, LANstep's redirector utility allows access to shared files through Microsoft Windows' File Manager, according to Fuller.

LANstep is not simply a repackaging of Waterloo Microsystems' software, according to Hayes. Though his company purchased the assets of Waterloo Microsystems in December, the two companies had been working together for the past year to develop LANstep, according to company officials. Hayes has added utilities, a C-language library and support for Ethernet, and has enhanced the software's application program interfaces and its user interface.

The target market for LANstep is organizations with between two and 80 personal computers where there has been little penetration of networking technology, according to Hayes.

"I think that the market size is quite enormous. Those people have been waiting on the sides for a product that is simple enough to use yet expandable," Dataquest's Hunt said.

LANstep is licensed in five-user increments. The basic five-user license costs $595. In April, a five-user expansion kit will be available for $395.

Also available in April will be the LANstep Developer Kit, which costs $595, and the LANstep Mail Gateway, costing $395. The gateway will allow LANstep Mail to be used across a modem to a remote LANstep site.

For more information, write to Hayes at P.O. Box 105203, Atlanta, Ga. 30348, or call the company at (404) 449-8791. ◻

## HLS adds to ProLINC

*continued from page 25*

"We have a rich multivendor environment here," he said. "We have an IBM mainframe with a TCP/IP gateway, a VAXcluster, Suns, Unix boxes, 3Com LANs and more. I'm looking forward to some of the new functionality."

Andrego said he has other connectivity packages installed but few support connectivity to other networks using native protocols. "For users that need access to a wide variety of platforms — and for those that need to talk in native protocols — this is definitely the product of choice."

ProLINC 2.0 is expected to be available in April for $595. ◻

## Print services for LAN Mgr.

*continued from page 25*

LANSpool for LAN Manager can support as many as five printers on any designated print server and as many as 25 printers attached to local workstations, according to Leo Spiegel, executive vice-president of marketing and business development for LANSystems based in New York.

According to Spiegel, LANSystems plans to offer print services products for other operating systems as demand increases. "We brought out LANSpool for LAN Manager because we were seeing a lot of demand for LAN Manager," he said. "Right now, we're looking into Unix and [Sun Microsystems, Inc.'s Network File System]. That's one of the major environments we want to work in."

LANSpool for LAN Manager is available now. A single-server, unlimited-user license fee costs $495. ◻

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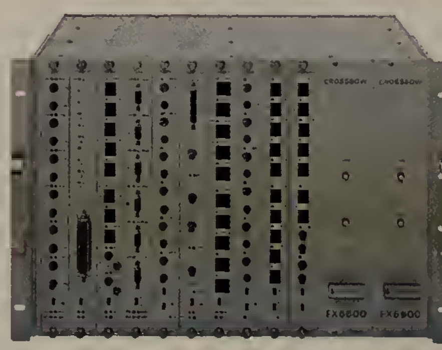

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# MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

## Worth Noting

> "When a company stoops to the level of monitoring their employees' E-mail, there's a good chance there's serious trouble brewing within that organization."

**Michael Toto**
Vice-president of corporate
telecommunications
Johnson & Higgins
Princeton, N.J.

## Association Watch

Attorney Benjamin Wright, author of *EDI and American Law,* has teamed up with Connected Education, Inc. to offer an on-line seminar called **"EDI: Legal, Accounting and Records Issues."**

The month-long interactive computer conference, which will explore the legal issues surrounding electronic data interchange, is available to anyone with access to a personal computer and modem.

Topics covered will generally follow the book *EDI and American Law* and will include new information and late-breaking developments. Participants can log on any time of day from the convenience of their home or office, and interact with the author-instructor and other participants.

*EDI and American Law* is the first North American book on the legality of EDI. The publication identifies the issues of electronic transactions, dispels myths and suggests solutions.

Written in an easy-to-read style, it bridges the gaps between technicians, business professionals and lawyers.

The first seminar will run from Feb. 25 to March 26. Two others will be held from June 25 to July 24 and from Oct. 15 to Nov. 14. The cost is $575 per person.

For more information, contact Connected Education, Inc., 92 Van Cortlandt Park South, Bronx, N.Y. 10463, or call (212) 549-6509.

"Telecommunications is a great career for women. It's a vibrant field, and — if you know what you're doing — the opportunities are almost limitless."

**Patricia Todus**
**President**
**Northwestern Technologies Group**
**Chicago**

# Women still face hurdles within networking arena

Execs offer advice on scaling corporate ladder.

**By Maureen Molloy**
Staff Writer

While women have made great strides in the network arena since divestiture, there are still plenty of challenges ahead for female network professionals in corporate America.

Divestiture greatly expanded the job opportunities available to women and boosted many of their careers. But women in the networking field say it will probably be another decade before the number of female net managers equals that of males in large companies.

They acknowledge that women need to increase their visibility within corporations, hone their managerial skills and take better advantage of educational opportunities in order to grab more of the top-level positions currently held by men.

"It wasn't until deregulation that women were able to break out of the customer service/operator jobs and into career positions in the field," said Linda Reising, a vice-president at Northern Trust Co. in Chicago. "Since then, women have been making great strides."

Patricia Todus agreed. "Divestiture brought great career opportunities for women because suddenly it was a brand new ball game," said Todus, president of Northwestern Technologies Group, which provides communications services to Northwestern University and Northwestern Hospital. "The Bell-oriented male society of the '60s and '70s was dying, so women had a much easier time infiltrating the ranks."

Todus was the second recipient of the Chicago Industrial Communications Association's Robert C. Hagglund Award for achievements in telecommunications. (The first recipient was MCI Communications Corp. President William McGowan.)

Todus said women actually have an edge over men in that they have strong skills in consensus building and participatory management, a leadership style that is increasingly in demand in corporations today.

But, she added, women must strive for greater visibility within their organizations.

"I've found there's a reticence by too many women in this field to wave their own flag, which only hurts them professionally," Todus said. "The bottom line is that if you're not visible, you won't succeed."

**Judy DiMattia**

That's true, said Judy DiMattia, an academic information systems consultant at IBM who formerly directed a $14 million voice and data network project at New York University.

"Women are doing much better today than ever before, but they've still got to develop better management skills and give themselves better exposure," said DiMattia, who has also directed network projects at Princeton University, Farleigh Dickinson University and the University of Michigan.

*(continued on page 56)*

# Nets help firms react swiftly to mart flux

Managers called on to provide the infrastructure necessary to speed new products to market.

**By Wayne Eckerson**
Senior Editor

A key to success in the 1990s is the speed with which a company brings new products and services to market and responds to customer needs.

To that end, companies are relying more than ever on network managers to implement net facilities and applications that can speed the flow of information among employees and business partners.

"Time is the luxury no company can afford," said Howard Anderson, managing director of The Yankee Group, a market research firm in Boston.

"Companies that design and market new products and services faster than the competition will be able to increase market share and lock in customers," he said.

### Plan ahead

Most managers said the key to helping their companies move quickly in the marketplace is to anticipate business needs well in advance and deploy the network facilities required to support future applications.

"Nobody ever told us to build an international network, but we knew that's what would be needed to keep the company competitive in the 1990s," said Stanley Welland, manager of corporate telecommunications at General Electric Co.

GE has built an international network using services from AT&T, France Telecom and British Telecommunications PLC that Welland claims gives the company a "foot up against the competition." The network, which supports voice, data, facsimile and video, enables employees anywhere in the world to exchange information and data as if they are in the same room, Welland said.

"The network accelerates the development of new products and improves our ability to respond to customer needs," Welland said.

Net managers also said it's important to build an infrastructure that ensures speed to market.

For example, The Travelers Corp. is moving toward a client/server computing environment that it believes will speed the development of new mission-critical business applications.

Client/server computing will enable the Hartford, Conn., insurance firm to implement strategic applications in four to six months instead of the three to five years it currently takes in the mainframe environment, said Trav Waltrip, vice-president of telecommunications at The Travelers.

"Our business is changing so rapidly and we get so many new information demands every day that we have to move fast," Waltrip said. "By the time we finished developing [mainframe] applications, user businesses had changed so much that the applications were obsolete or irrelevant."

> "The net speeds development of products and our response to user needs."

▲▲▲

The Travelers is reengineering its nationwide network to provide high-speed interconnection between the more than 300 token-ring networks already in place. The company is also developing several tools to manage traffic on the wide-area network ("Client/server pioneers face tough going," *NW,* Jan. 28).

It is also using a technique Waltrip calls "teaming" to speed development of client/server applications that will run across the network.

In teaming, The Travelers forms a group comprising two or three highly skilled client/server programmers and several end users to spearhead the development of each new application.

The programmers spend all day learning users' application requirements firsthand and then write code at night. Users review the programmers' work and give suggestions for improvement, which are incorporated into the working prototype.

"We form the teams, give them a great deal of latitude, and in six months, they have built a fully functional application," Waltrip said.

*(continued on page 56)*

# IBM lets the
# Now 486 technology

Without the proper venue, dazzling ability often falls short of expectations. That's certainly been the case with the Intel 486™ microprocessor, a processor that hasn't been utilized to its full potential. So that's what IBM set out to do. Just as it takes a seasoned jockey to turn a thoroughbred into a champion, it took IBM to give the 486 processor every opportunity to work its genius. Introducing IBM Personal System/2® Model 90 XP 486 and Model 95 XP 486.

From speed and storage capacity to graphics capabilities and upgradability, the new PS/2® Models 90 and 95 are designed to optimize the power of the Intel 486 processor and deliver a truly balanced performance—equipping you with solutions for today, and providing a platform of growth for tomorrow.

### THE 90'S ARE A POWERFUL BREED.

Right out of the starting gate, the Models 90 and 95 will astound you with their power and sophistication. Featuring a 33 MHz processor and a 25 MHz processor that's easily upgraded to 33 MHz, they deliver blazing speed and balanced performance, expanding your capacity for computer-intensive applications like CAD/CAM, financial modeling and multimedia. The course between your data and your processing has also been strengthened—the Micro Channel™ 32-bit data path, combined with a lightning-quick data-transfer rate, not only optimizes the present power of the 486 processor by feeding it a steady stream of information, but also provides for processor enhancements and will allow you to benefit from advanced operating systems to come. Plus these other innovations: a wider 64-bit data path which optimizes the 486 processor's access to system memory; 4MB memory standard (expandable to 32MB); and a 256KB cache option for even greater speed. All in all, it's easy to see how the concept of computer "power" has been enhanced, and how IBM helps you take full advantage of every second of computing time.

### BRILLIANCE ON DISPLAY.

With increased power comes increased capabilities—the most visually stunning of which is Extended Graphics Array (XGA), standard on the PS/2 Models 90 and 95, and the heart of IBM's spectacular new display presentation.

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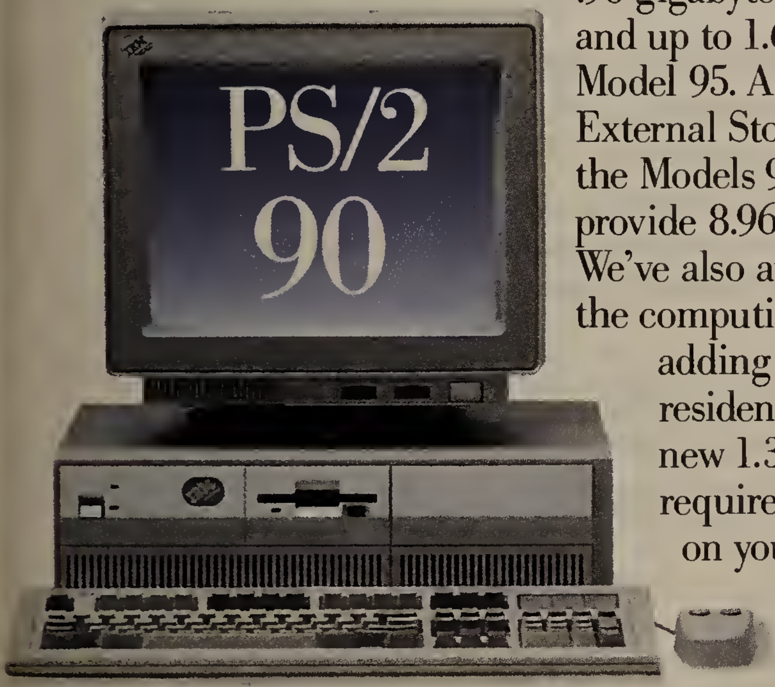
publishing, image processing and engineering design with a stunning new look.

| Features | IBM PS/2 Model 90 | IBM PS/2 Model 95 |
|---|---|---|
| **Microprocessor** | | |
| Standard | 80486 | 80486 |
| Clock speed | 25-33 MHz | 25-33 MHz |
| Optional upgrade | 33 MHz | 33 MHz |
| **Memory** | | |
| Standard | 4MB (70ns) | 4MB (70ns) |
| Maximum | 32MB | 32MB |
| **Integrated Functions** | Extended Graphics Array (XGA) and display port, DMA serial port (dual ports on Model 90), DMA parallel port, pointing device port, keyboard port, diskette controller support for three drives, SCSI Adapter with Cache. | |
| **Fixed Disk Storage** | | |
| Standard | 80-320MB | 160MB-320MB |
| **Display Modes** | | |
| APA Modes | XGA (includes all VGA modes) 640 x 480 x 256 colors/ 64 gray shades; 1024 x 768 x 16 colors/gray shades; hardware support for 132 column text mode; 16-bit direct color mode at 640 x 480 x 64K colors | |
| **Available Expansion Slots** | three 32-bit | six 32-bit |
| **Bus Architecture** | | |
| Data path | MCA 32-bit | MCA 32-bit |

### FAST TIMES ARE IN STORE.

To satisfy even the most demanding storage needs, from LAN systems to data base management to numeric-intensive applications like financial analysis and modeling, IBM has one of the most advanced solutions available. IBM's super-fast SCSI hard disks are pure state-of-the-art performers. With additional hardfile expansion bays, the PS/2 Models 90 and 95 have enormous storage potential—up to .96 gigabytes on the Model 90 and up to 1.6GB on the Model 95. And with the PS/2 External Storage Enclosures, the Models 90 and 95 can provide 8.96GB and more. We've also augmented the computing power by adding more flexibility to resident memory—our new 1.3 version of OS/2® requires as little as 2MB on your system. With this streamlined version you not only get more room for applications, but some users will experience a substantial performance increase in system functions as well. So when you need to make great strides with your computing power, you can count on IBM to give you terrific storage capability wherever you may need it.



### DESIGNED TO KEEP YOU OUT IN FRONT.

For the turns and hurdles ahead, you'll need technology that has foresight built in. Through a unique design, the Expandable Processor (XP) allows for an architected family of upgradable processor enhancements that can extend the life of your system. With Micro Channel busmaster adapters, you can incorporate multiple processors—like adding "computers" to your computer. And coupled with the industry-standard Small Computer System Interface (SCSI), you'll be able to support new applications and continue to build on your system as your needs become more varied and complex.

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How're you going to do it?

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This headline is probably one of the few rumors about Mitel that hasn't been circulating lately. For the record, I'd like to provide you with some information that doesn't seem to be getting in the press, and certainly won't be offered by our competitors.

In the United States, one in every four PBX systems in service bears the Mitel brand. We are the leader in the under-100-line market, and Mitel has sold more PBX systems than any other manufacturer in the world.

ELVIS SEEN AT MITEL

[KANATA/MEMPHIS] At approximately 3:00 p.m. yesterday, the King himself was spotted in the staff lounge at Mitel headquarters in Kanata. Wearing the now-famous powder blue polyeste suit, he emerged from the ... singing. ... it my way...

**Experienced Leadership**

I am no stranger to this company, having served as a member and Chairman of the Board since 1984 and as president from 1985-1987. I intend to build on past momentum, and structure the company to further improve our focus on our most important markets.

**Continued Financial Stability**

Mitel is a $400-million-plus company, in the enviable position of having virtually no long-term debt, and a positive cash position.

**Viable Ownership**

This is what Mr. John Malone, CEO of a leading research organization, The Eastern Management Group, has to say: "In my opinion, the current situation with British Telecom will not affect Mitel's long-term viability… Mitel is a company with excellent prospects. It has a strong product, a good installed base and a positive direction for the future."

**Number One in Customer Satisfaction**

I am especially pleased to be able to say that Mitel is rated highest in overall customer satisfaction in North America.* This high level of satisfaction is due in large part to the quality of our product. Today, Mitel plants in the United States, United Kingdom, New Zealand, and Canada are ISO registered, which means they meet stringent, internationally recognized standards. This emphasis on quality and dependability has attracted such customers as the U.S. Coast Guard, Marriott Corporation and the Toronto Metropolitan Police.

In conclusion, I'd like to state that although rumor mills are inevitable, our entire industry would be better served by focusing our energies on *listening* to our customers, to better meet or exceed their expectations and business needs.

A F Griffiths

Anthony F. Griffiths
Chairman, President and Chief Executive Officer
Mitel Corporation

MITEL

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* DataPro 1989 User Ratings of PBX Systems

# INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

## World News

**Codex Corp.**, based in Mansfield, Mass., recently said it has named Transdata, S.A. de C.V. its sole distributor for Mexico.

Mexico City-based Transdata has helped users build networks in Mexico for more than 16 years.

These projects include the construction of electronic funds transfer and automated teller machine networks for Mexican banks, Codex said.

**Scientific-Atlanta, Inc.** in Atlanta said it has received a $2.4 million order from MCI Communications Corp. to install an International Telecommunications Satellite Organization digital earth station in Guam.

The earth station will serve as a Pacific hub for MCI. The 15.5-meter satellite dish will be used to support international digital public switched voice and private-line services.

Installation of 'the new earth station is scheduled for completion in May, Scientific-Atlanta said.

**GTE Spacenet Corp.** recently said it is installing two new digital earth stations in Kapolei, Hawaii, which will enable GTE Hawaiian Telephone Company, Inc. to provide digital, international private-line and switched services to 24 Pacific Rim countries.

GTE Hawaiian Telephone is the only U.S. local exchange carrier that is allowed to provide international services, GTE Spacenet said.

# FCC urged to postpone rule about satellite competition

State, Commerce ask agency to weigh implications.

**By Ellen Messmer**
Washington Correspondent

WASHINGTON, D.C. — The U.S. Departments of State and Commerce have asked the Federal Communications Commission to postpone a decision on a controversial proceeding regarding modification of the rules governing international satellite competition.

The FCC is considering Pan American Satellite Corp.'s (PANAMSAT) petition to lift a ban preventing it from linking its international satellite services to the public switched network. That change would essentially end the monopoly INTELSAT has on global public switched satellite traffic.

PANAMSAT wants the rules changed. And apparently, so do users.

▲▲▲

The State and Commerce departments have asked that the issue be put on hold until the Bush administration releases its position on the matter, which is expected by May.

Janice Obuchowski, the Commerce Department's assistant secretary for communications and information, and Bradley Holmes, U.S. coordinator and director of the State Department's Bureau of International Communications and Information Policy, sent a letter to FCC Chairman Alfred Sikes urging him to postpone a decision on the issues raised in the PANAMSAT petition until its national and foreign policy implications are clear.

Although State Department sources said they haven't received an answer from the FCC, it's likely the FCC will hold off on any rule making until the administration has its say.

Jim Ball, associate director of the FCC's office of international communications, told *Network World*, "We're considering what our next step will be."

Currently, only Communications Satellite Corp., the U.S. representative to the 118-member International Telecommunications Satellite Organization, is allowed to carry public network traffic over international satellite facilities.

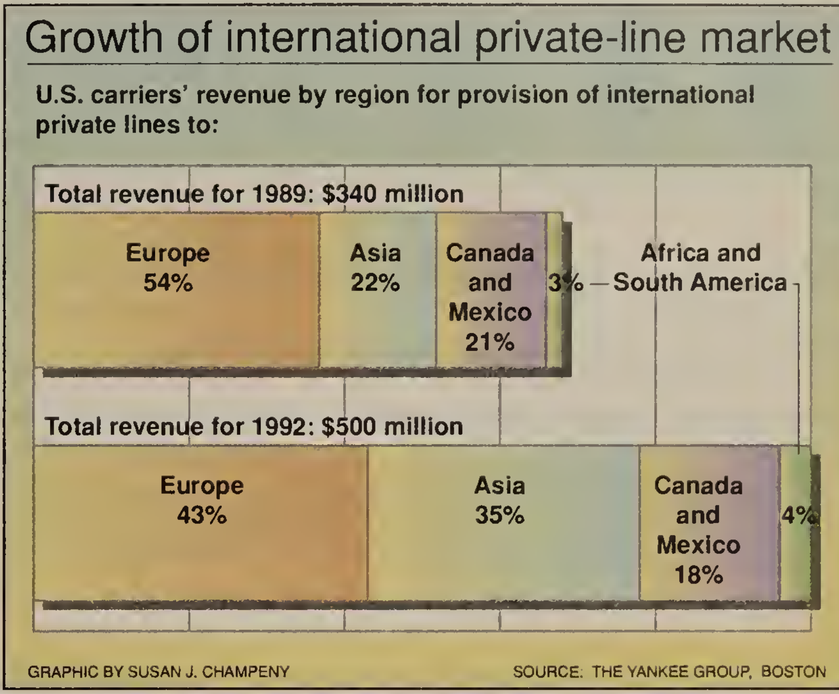
In 1985, the FCC, backed by a White House directive, allowed PANAMSAT to begin offering satellite services as a "separate systems operator." Separate systems operators are forbidden to interconnect their services with public networks out of concern that the multinational investment in the INTELSAT system would be undermined by competition.

In 1985, switched traffic was estimated to generate 85% of INTELSAT's revenue.

But PANAMSAT, saying its entry into the market has already lowered prices, wants the rules changed. And apparently, so do users, who responded enthusiastically to PANAMSAT's petition in filings with the FCC.

In fact, of the 53 comments received at the FCC, COMSAT has emerged as the only opposition voice, saying that INTELSAT is moving toward "constructive change" and any unilateral U.S.

*(continued on page 34)*


Growth of international private-line market

U.S. carriers' revenue by region for provision of international private lines to:

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: THE YANKEE GROUP, BOSTON

# Takeover of TRT/FTC to benefit int'l users

Acquisition would give Cable & Wireless increased international presence and range of new services.

**By Barton Crockett**
Senior Editor

VIENNA, Va. — Even though it would be the company's fifth change of ownership in less than a decade, the proposed acquisition of TRT/FTC Communications, Inc. by Cable & Wireless North America, Inc. is likely to benefit users.

The acquisition would enable Cable & Wireless Communications, Inc., which is owned by Cable & Wireless North America, to increase its international offerings by using TRT's extensive international switched, private-line and messaging services. TRT/FTC would benefit from the resources and reputation of Cable & Wireless, some users said.

"Being taken over by [Cable & Wireless] is very good because it is a very old, established company," said a network manager with a major New York bank that uses TRT/FTC's services extensively. The manager requested anonymity.

Another network manager who uses services from both TRT/FTC and Cable & Wireless North America's parent, Cable & Wireless PLC, said he was very confident that the acquisition would work out well. He said both carriers have supplied his company with excellent service at a good price.

**Terms of the deal**

Cable & Wireless North America late last month announced plans to purchase TRT/FTC from Vancouver, Wash.-based Pacific Telecom, Inc. for $174 million. The deal must be approved by the Federal Communications Commission. Cable & Wireless North America expects this approval to come within five months, a spokeswoman said.

Cable & Wireless PLC is a Lon-

*(continued on page 34)*

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## FCC urged to postpone rule

*continued from page 33*

move to reexamine the restrictions might derail the process and possibly lead to international tensions.

Citicorp, Electronic Data Systems Corp. (EDS), International Telecommunications Users Group and Manufacturers Hanover Corp. were among many lending support. Phillip Spector, an attorney with Goldberg & Spector representing PANAMSAT, noted that all foreign comments have favored further deregulation, as opposed to the foreign post, telegraph and telephone administration comments against deregulation filed in 1984.

In its comments, Citicorp said its international data network operations are hampered by regulatory requirements that force the segregation of switched and nonswitched traffic.

EDS emphasized that "service innovation is thwarted and downward pressure on prices is restricted."

If the State Department, Commerce Department and the FCC line up in favor of deregulation, COMSAT will have to argue the PANAMSAT case at a special meeting of INTELSAT, which would be held to take up the question of allowing PANAMSAT greater freedom.

Bruce Crockett, president of COMSAT World Systems Division, said changes made in international regulation should be made by the executive branch of government, not the FCC alone.

Crockett raised questions about the FCC's authority to act in the matter, pointing to language that Congress included in both the 1986 and 1987 Foreign Relations Authorization Act that gave the executive branch the power to decide policy toward INTELSAT.

Emphasizing that the INTELSAT member nations are open to liberalization, Crockett said, "FCC action at this time would undermine U.S. credibility and jeopardize the accomplishments to date. By contrast, as long as the U.S. continues to work with other nations within the INTELSAT framework, it can anticipate genuine progress toward liberalization." ◻

## TRT/FTC takeover to benefit int'l users

*continued from page 33*

don-based communications company that owns carriers around the world, including U.K. carrier Mercury Communications, Ltd. Its Cable & Wireless North America unit owns U.S.-based Cable & Wireless Communications, Inc. and Canadian reseller Cable & Wireless Telecommunications, Inc.

TRT/FTC is 85% owned by Pacific Telecom and 15% owned by France Cables et Radio (FCR), a government-controlled company. Pacific Telecom said it plans to purchase the 15% stake from FCR and sell the whole company to Cable & Wireless North America if the deal is approved.

According to John Davenport, Cable & Wireless' North America chief executive officer, the purchase of TRT/FTC will aid Cable & Wireless Communications by enabling the carrier to expand its international service.

TRT/FTC derives between 70% and 80% of its $200 million total annual revenue from international services. It has operating agreements to provide international switched and private-line services to 17 countries, including service to Mercury Communications and British Telecommunications PLC in the U.K., as well as to carriers in Argentina, Australia, Chile, Denmark, Egypt, France, Hong Kong, Singapore, South Korea and Venezuela.

TRT/FTC also has operating agreements to provide international telex, packet-switching and messaging services to more than 100 countries.

Davenport said more than half of TRT/FTC's revenues come from telex services. He said about 3,000 to 4,000 of TRT/FTC's 10,000 customers subscribe to the company's international private-line and switched services.

By contrast, Cable & Wireless Communications does not currently offer international messaging, packet switching or telex service.

Excluding Canada, the company provides no international private-line service and is only able to provide international switched services by reselling service from other carriers. As a result, only 20% to 25% of Cable & Wireless Communications' $323 million annual revenue comes from international services, Davenport explained.

Davenport said Cable & Wireless North America plans to maintain TRT/FTC as a separate unit from Cable & Wireless Communications. But he added that Cable & Wireless Communications will begin using TRT/FTC facilities to provide international services.

Mark Lowenstein, an analyst at The Yankee Group in Boston, said Cable & Wireless Communications needs TRT/FTC's facilities and foreign operating agreements in order to become a major player in the growing international private-line market (see graphic, page 33).

But Lowenstein added that one has to wonder about TRT/FTC's ability to survive as a stable carrier, given its recent management changes.

TRT/FTC was created in 1990 by the merger of Tropical Radio Telecommunications, Inc. and French Telegraph Cable Co. Pacific Telecom acquired TRT from United Nuclear Corp. in 1989 and FTC from McDonnell Douglas Corp. in 1987. McDonnell Douglas received TRT as part of its acquisition of Tymnet in 1985. ◻

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# PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

## First Look

### DEC VAXstations get X Window software

**Digital Equipment Corp.** recently announced **VAXELN Window Server,** software for the company's existing VAXstation line that enables VAXstations to emulate DEC's VT-1300 X Window System terminals.

VAXELN Window Server enables users to access either VMS or Ultrix applications on multiple hosts simultaneously using DECnet or the Transmission Control Protocol/Internet Protocol. The software resides on DEC hosts, which download software kernels to individual VAXstations.

VAXELN Window Server software costs $570 per workstation software license; it is available now.

*Digital Equipment Corp., 146 Main St., Maynard, Mass. 01754; (800) 344-4825.*

### Harris Adacom bridge ties coax to NetWare LANs

**Harris Adacom Corp.** recently unveiled a new bridge that integrates coaxial cable-attached personal computers with IBM 3270 emulation capabilities into Novell, Inc. NetWare local-area networks.

Called **CoaxNet,** the bridge provides LAN functionality and services for as many as 32 coaxial-attached personal computers without the need for a LAN adapter or rewiring.

According to Gil Ardon, CoaxNet product manager, users must use eight-port IBM 3299 multiplexers to connect a coaxial-based workstation to four ports on the bridge. The bridge can be configured to connect to a single Ethernet or token-ring LAN, he added.

LAN services are provided to the coaxial-attached personal computers as if they were locally attached to the LAN server. Coaxial-attached devices can access NetWare file servers and printers, as well as use electronic mail and share data bases.

CoaxNet costs $8,000 to $10,000, depending on configuration, and is scheduled to ship later this quarter.

*Harris Adacom Corp., 16001 Dallas Pkwy., Dallas, Texas 75380; (214) 386-2000.*

# Process Software releases upgraded TCPware for VMS

New version broadens functions for DEC users.

FRAMINGHAM, Mass. — Process Software Corp. last week took the wraps off Version 2.2 of TCPware for VMS, adding such features as data base support, distributed programming services and IBM 3270 emulation capabilities.

The company said the new features provide users of Digital Equipment Corp. computers with a broader range of services and functions than are available on DEC's own Transmission Control Protocol/Internet Protocol offerings.

Further, the company said TCPWare for VMS Version 2.2 is available in modular fashion, unlike DEC which sells its TCP/IP product as a single package. TCPware for VMS is a suite of network protocols and applications that enable DEC VAX computers to communicate over a TCP/IP network.

### DBMS support

Version 2.2 of the software now supports Sybase, Inc.'s relational data base management system via the SRI QIO interface, a de facto standard set of VMS functions.

Support for Sybase's SQL Server and Open Client products enables a user to support distributed data bases over a TCP/IP network, according to Bernie Volz, engineering manager at Process Software.

### RPCs address need

Version 2.2 of TCPware for VMS also includes a set of remote procedure call (RPC) development tools with which users and software houses can develop client/server and distributed applications.

"This is something our users have been waiting for," Volz remarked. "A number of them need these tools to develop strategic applications that take advantage of different systems and resources across their TCP/IP networks."

Called ONC RPC Services, TCPware's distributed application programming tools are based on Sun Microsystems, Inc.'s Open Network Computing (ONC) protocols for RPCs.

Process Software opted for ONC over Hewlett-Packard Co. Apollo Division's Network Computing System, Volz said, because ONC provides better support for Sun's Network File System, which is also supported under TCPware for VMS.

Volz said that while DEC has announced intentions to support RPC technology, it has yet to provide that functionality in its TCP/IP software.

*(continued on page 56)*

# *HP introduces three new portable LAN media testers*

WASHINGTON, D.C. — Hewlett-Packard Co. recently rolled out a new line of hand-held media testers for local-area networks.

HP unveiled three models — Quick Scanner, Cable Scanner and Pair Scanner — all of which are time-dimension reflectometers that send scanner pulses down a cable and capture the echo of those pulses to calculate the location of a fault.

Quick Scanner, the line's low-end model, can detect broken wires, short circuits and miswires, which occur when the four wires in a piece of shielded or unshielded twisted-pair wiring are incorrectly crossed.

Besides detecting wiring problems, both Cable Scanner and Pair Scanner possess the additional ability to detect noise on the line and to check for the physical location of faults in a wiring closet or behind a wall.

Pair Scanner also has the ability to check for link pulse signals, a sign of hub activity in 10BaseT LANs.

In addition, Pair Scanner users can set event thresholds that will trigger alarms. When the Pair Scanner is connected to an RS-232 connector on a dial-up modem, the alarm can be displayed remotely on a personal computer.

Prices are $995 for Quick Scanner, $1,495 for Cable Scanner and $2,495 for Pair Scanner.

Cable Scanner and Pair Scanner come with floppy disks for operating the computer programs.

For more information, write to Hewlett-Packard Co. Inquiries, 19310 Pruneridge Ave., Cupertino, Calif. 95014, or call (800) 752-0900.

### Solbourne Series5E/800i server pricing

| Model | Number of CPUs | Memory (in M bytes) | Price |
|---|---|---|---|
| Series5E/801i | 1 | 32 | $74,900 |
| Series5E/802i | 2 | 32 | $84,900 |
| Series5E/802i | 2 | 64 | $155,395 |
| Series5E/804i | 4 | 128 | $271,995 |
| Series5E/804i | 4 | 256 | $450,590 |

**Standard features:**
- Ethernet controller
- 2 RS-232-compatible ports
- OS/MP Unix symmetric operating system
- External Small Computer System Interface bus interface
- Sun Microsystems, Inc. SunView
- Solbourne X Window Manager
- 7-slot VMEbus operating at 25M byte/sec

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: SOLBOURNE COMPUTER, INC., LONGMONT, COLO.

# High-powered server is SPARC-compatible

Multiprocessor Solbourne server said to offer 20% better price, performance than Sun SPARCserver.

**By Alison Conliffe**
Assistant Features Editor

LONGMONT, Colo. — Solbourne Computer, Inc. recently introduced a high-performance multiprocessor server it claims offers users more computing power for less cost than a high-end server from Sun Microsystems, Inc.

Solbourne's Series5E/800i provides users with a 20% improvement in price and performance over Sun's high-end SPARCservers, which are Reduced Instruction Set Computers based on Sun's Scalable Processor Architecture (SPARC).

Solbourne said the Series5E/800i is a mid-range departmental server suitable for multiuser and client/server networks.

In some configurations, the Series5E/800i offers twice the performance of SPARCservers at the same or lower price, the company said.

The Series5E/800i comes in single-, dual- and quad-processor models. The latter two support symmetric multiprocessing, in which the operating system's kernel functions are simultaneously executed by each CPU.

The primary advantage of symmetric multiprocessing is that it balances the processing load of the server, which maximizes throughput, the firm said.

"Multiprocessing can significantly increase your throughput. With it, you can run more applications simultaneously, you can support more users simultaneously or a combination of both," said Travis White, Solbourne's vice-president of marketing.

White said the Series5E/800i is the only SPARC-compatible server on the market that supports symmetric multiprocessing. It can run more than 2,100 SPARC applications.

Each processor is based on Cypress Semicondutor Corp.'s CYC7601 microprocessor, a SPARC-compatible microprocessor.

The device can perform as many as 114 million instructions per second and comes with 32M bytes of memory (expandable to 640M bytes). It offers from 860M bytes to 2G bytes of intelligent peripheral interface disk storage, with 15 msec average disk seek access times.

> The device can perform as many as 114 million instructions per second.

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The Series5E/800i runs Solbourne's OS/MP, a multiprocessing version of Sun's SunOS. It supports all Solbourne and SPARC-compliant workstations, as well as personal computers and X Window System terminals.

Since it is optimized for use in networks of Sun workstations, the Series5E/800i supports the entire suite of Sun's Open Network Computing products, including the Network File System and Sun's remote procedure call technology, White said.

The Series5E/800i comes with an Ethernet controller, two

*(continued on page 56)*

# OPINIONS

**VENDOR SELECTION**

BY DAVID SCHMALTZ

## The importance of knowing your vendor

Much has been written about selecting software packages, including how to compare features, rank performance and assess functionality. Less information is available on an equally important aspect of selecting and managing packaged network software — knowing the vendor.

Here are some questions managers should ask themselves before selecting a vendor:

■ **Can the vendor support your network?** It's not the vendor's job to support your network, right? Wrong! Some of the unknowns remaining after the evaluation can be managed by negotiating purchasing or maintenance contract provisions. But not all such needs can be addressed in a contract.

> If you don't fit the vendor's customer profile, interaction will be difficult.
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Call the vendor's 800 number. Can you get through to a qualified technician or service representative without being put on hold or waiting for a call back? Do they understand your questions? Will they accept ownership of reported problems?

■ **How formal is the vendor's development process?** Applications running in an open environment must be more robust than those that are captive to a single operating environment. Application design and development must be more disciplined in an open environment.

Ask the vendor about its development process. Ask to see some design documentation and to speak with the chief designer of the product. Take note if none exists. In general, software developed with no formal methodology will lack the flexibility and robustness necessary to deliver full value to an open systems environment.

■ **Can you communicate with this vendor?** Some vendors are capable of being all things to all people, others are consciously focused on being one specific thing to all people, and still others are capable of being all things to one specific group of people. If you don't fit the vendor's target customer profile, interaction will be difficult.

Check the vendor's advertisement. Who does it claim to be? How well does that match with what you'd like it to be? If possible, find the vendor whose public image best matches your organization's personal image.

■ **What's the vendor's reputation?** Check references. As one network manager remarked, "It's not that I don't trust them. It's that if I do this, I won't have to trust them!" Check the references supplied by the vendor, and check with personal contacts. A vendor's products are generally as good as its reputation.

If you get positive answers to the above questions and decide to select a particular vendor, remember the importance of staying in touch. Since the squeaky wheel gets the grease, it helps to at least be recognized as a wheel when grease time comes around. Once the software is purchased, don't expect the vendor to attend to your needs without some reciprocity.

Give the vendor a reason to maintain an understanding, supportive relationship. Give the vendor honest feedback. Tell it what it does right and wrong. Understand what the vendor needs from you and give it when you can.

Managing software is a human endeavor. While no one should purchase software without rigorous technical evaluation, the assessment of vendor capabilities is of equal importance.

*Schmaltz is the supervisor of process management and control for Standard Insurance Co. in Portland, Ore.*

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EDITORIAL

## Contrasting RBHC marketing myths and local-loop realities

The regional Bell holding companies have invested a tidy sum in advertising designed to convince users that the U.S. is being shortchanged by the Modified Final Judgment restrictions.

The ads raise disturbing notions that the restrictions have harmed our nation. For example, they are alleged to have hurt our educational and medical systems.

One ad claims U.S. students could have video access to "leading scholars over existing telephone lines," while another says doctors could be "in touch with top medical experts using video windows" — if only the RBHCs were not chained by the Modified Final Judgment's onerous strictures.

But two recent stories raise a disturbing issue, one that has nothing to do with the Modified Final Judgment, but everything to do with the RBHCs' primary business — the local loop.

One story discussed how J.C. Penney Company, Inc. is planning to use Integrated Services Digital Network Primary Rate Interface links as an integrated access method for its stores. But J.C. Penney executives say the project is being hamstrung by the lack of tariffed ISDN services from local carriers ("J.C. Penney looks to ISDN PRI as way to link stores," *NW*, Feb. 11).

In another article, a top network executive for the federal government also assailed the RBHCs, saying the promise of the Federal Telecommunications System 2000 — a promise of end-to-end digital connectivity — is being undermined by the reluctance of local exchange carriers to invest in digital facilities ("Fed agency to run FDDI to desktops," *NW*, Feb. 11).

Today, many companies provide equipment and services that can help doctors, educators or anyone else find affordable, innovative solutions to network problems. Students have benefited from videoconferencing for years. Doctors already use networks to handle medical images and consultations.

There is little reason to believe that RBHC entry into manufacturing or other markets will provide any substantial benefit to users in the U.S.

The reality is that the RBHCs could best serve the interests of businesses and consumers by upgrading their networks and offering much-needed new services such as ISDN, switched high-speed data services and other offerings that they are empowered to provide today.

The RBHCs' funds are best spent on taking care of their core business — making sure the U.S. has the world's best local loop and the most modern services. And that includes the money spent on slick marketing and lobbying campaigns.

REGULATORY AFFAIRS

BY ALAN PEARCE

# The FCC should reallocate spectrum to benefit the public

Anyone who uses the radio, or wireless, spectrum knows that it is overcrowded and congested.

We belong to a nation on the move, and we like to communicate. We want information at any time, any place, anywhere and in any volume. But how is this possible in an age when it seems almost everyone is demanding a larger piece of this limited resource?

To answer that question, we need to reexamine how spectrum is allocated.

Within the U.S., the Federal Communications Commission has the sole responsibility for both the allocation and assignment of spectrum for use by the public. This statement, however, needs explanation and amplification.

First, the U.S. government — primarily, the Department of Defense — controls approximately 60% of the spectrum. Although it probably uses less than half of that amount, it nonetheless claims that it needs it all, just in case of some national or international emergency.

This setup withholds great chunks of spectrum that could be allocated for publicly beneficial uses.

Second, the FCC allocates spectrum to particular services, such as broadcasting (radio and television), cellular telephone, satellite transmission and private radio.

Once the FCC has allocated certain frequencies for particular purposes, it is extremely reluctant to reallocate spectrum, even to newer or more efficient and publicly beneficial services.

For example, the FCC has allocated to broadcasters sizable chunks of the nation's airwaves, which they use inefficiently. Indeed, many argue that radio and TV should not be broadcast at all, but instead should be piped into homes via cable or fiber.

Nicholas Negroponte, director of the Massachusetts Institute of Technology's Media Lab in Cambridge, Mass., advocates using the spectrum only for messages and signals that are interactive. Passive services such as radio and TV, he argues, should be delivered by wire.

The FCC simply will not hear of this, in large part because the nation's broadcasters are among the most politically powerful and active groups in Washington, D.C. They do not have to remind politicians, including President Bush, that broadcasters are needed if the politicians want access to the people.

> Firms and institutions that have been assigned licenses to operate on a particular frequency are reluctant to give it up.
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Politicians thrive on publicity and access, and broadcasters can give them both. Thus, the FCC is stymied in its attempts to reallocate the spectrum that broadcasters are wasting.

Third, the FCC assigns frequencies in the allocated spectrum to particular firms or institutions for use according to the allocation rules. Generally speaking, firms and institutions that have been assigned licenses to operate on a particular frequency are reluctant to give it up, regardless of whether or not they are using it.

The FCC attempts to cut down on spectrum waste by repossessing any spectrum that is not used for a specific purpose, but FCC license holders have developed numerous strategies for covering up the inefficient or wasteful possession of spectrum.

### Improvement plan

There are several ways in which the current inflexible system can be improved. First, Congress can decide to take some of the spectrum from the U.S. government and hand it to the FCC to reallocate for publicly beneficial uses. Rep. John Dingell (D-Mich.) has already introduced a bill for this purpose.

However, it will be a slow and painstaking process largely because the Defense Department is determined not to give any of its large share of spectrum to the FCC, no matter how publicly beneficial it might prove to be. The department thinks in terms of war and other emergencies and, therefore, claims that it needs all the spectrum it has — and more.

Additionally, the FCC can become a little more flexible in handling spectrum allocation and assignment. The National Telecommunications and Information Administration (NTIA) is currently studying spectrum allocation and efficiency, and it is expected to conclude that spectrum apportionment should be based on marketplace realities.

In its Notice of Inquiry, the NTIA said, "Since users would be paying for spectrum [under a marketplace approach], they would have incentives to employ the resource efficiently by not seeking more spectrum than they need and deploying cost-effective spectrum-conserving technology."

It is now up to Congress, the FCC and NTIA to find better ways of allocating and assigning the spectrum. This might result in some changes in the status quo and, with luck, in the availability of spectrum currently "occupied" by the U.S. government.

Lest we forget, both allocation and assignment are supposed to reflect broad public benefits, not narrow, crass commercial business interests.

*Pearce is president of Information Age Economics, Inc., a telecommunications research firm in Washington, D.C.*

**LIKE ALLIGATORS IN A SWAMP,** unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

## TELETOONS

BY FRANK AND TROISE

## LETTERS

**A lost opportunity?**

Your article "Making the Centrex choice" (*NW,* Dec. 10, 1990) contained incorrect information regarding Mitel, Inc.'s SX-200 analog private branch exchange. If the company featured in the article, Astro Office Products, Inc., had the correct information, the article might well have been called "Making the upgrade choice."

The Mitel SX-200 PBX product line — from analog to fully digital systems — offers customers a wide range of options for growth and expansion. The systems are fully compatible, so customers can buy only the capabilities they need with the assurance that they can cost-effectively upgrade as their business needs change.

The SX-200 PBX gained digital functionality and an increase in both line size and performance through a cost-effective field upgrade package introduced in 1985.

The upgrade package is compatible with every analog SX-200 system ever sold and would have given Astro the capacity to increase its system to 300 trunks and 500 telephones. The additional trunk capacity would have immediately eliminated Astro's problem of outbound callers being unable to obtain a trunk.

The total upgrade would have cost Astro much less than the purchase of a new system and would have enabled the company to avoid the costs associated with purchasing telephone sets and trunk cards as well as rewiring.

In 1986, a fully digital version of the switch, the SX-200 digital PBX, was introduced. Any existing SX-200 PBX can be upgraded to the SX-200 digital PBX. And this

*(continued on page 55)*

Network World *welcomes letters from its readers.*

*Letters should be typed and double-spaced. Mail them to Editor,* Network World, *161 Worcester Road, Framingham, Mass. 01701.*

*Letters may be edited for space and clarity.*

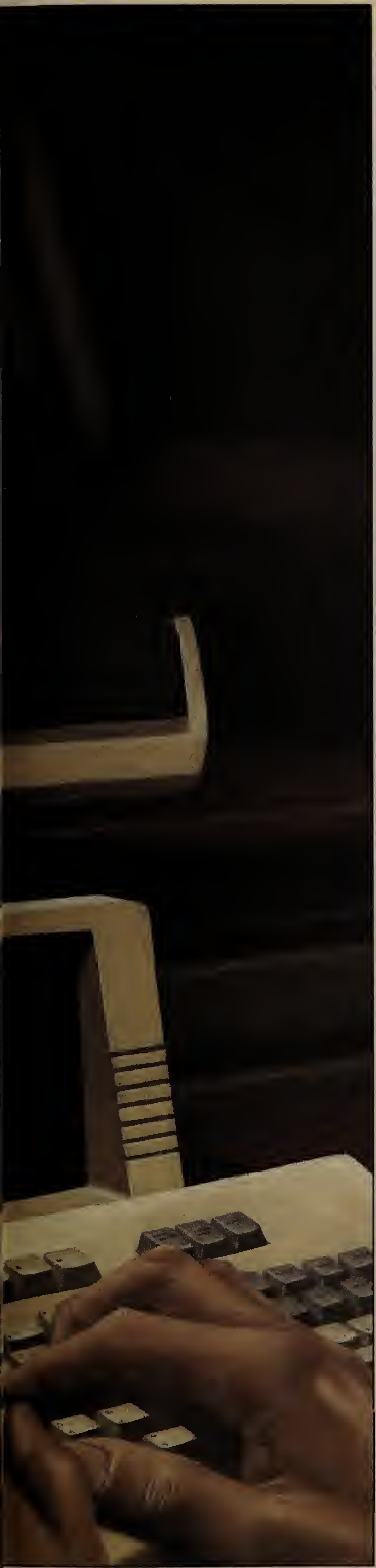


ILLUSTRATION ©1991 GREG MACKEY

Trends and TECHNOLOGIES RESHAPING networks:

### Image processing

# Imaging moves into corporate mainstream

CONTINUED FROM PAGE 1

There are very strong signs of a turn. Network operators at banks, insurance companies and other businesses are looking closely at image networks. Hospitals, whose image needs include storage and rapid access to X-rays and computerized tomography scans, have long been interested.

Some organizations that have recently set up image networks include Boston Financial Data Services, Inc. in North Quincy, Mass., The Huntington Bancshares, Inc. in Columbus, Ohio, Cardinal Glennon Children's Hospital of St. Louis, Beth Israel Medical Center of New York and the pharmaceutical manufacturer Burroughs Wellcome Co. in Research Triangle Park, N.C.

One of the most extensive image networks, still in the planning stages, belongs to HFC Bank PLC, headquartered in Windsor, England. When finally installed, HFC's network will transmit credit and banking records over wide-area links.

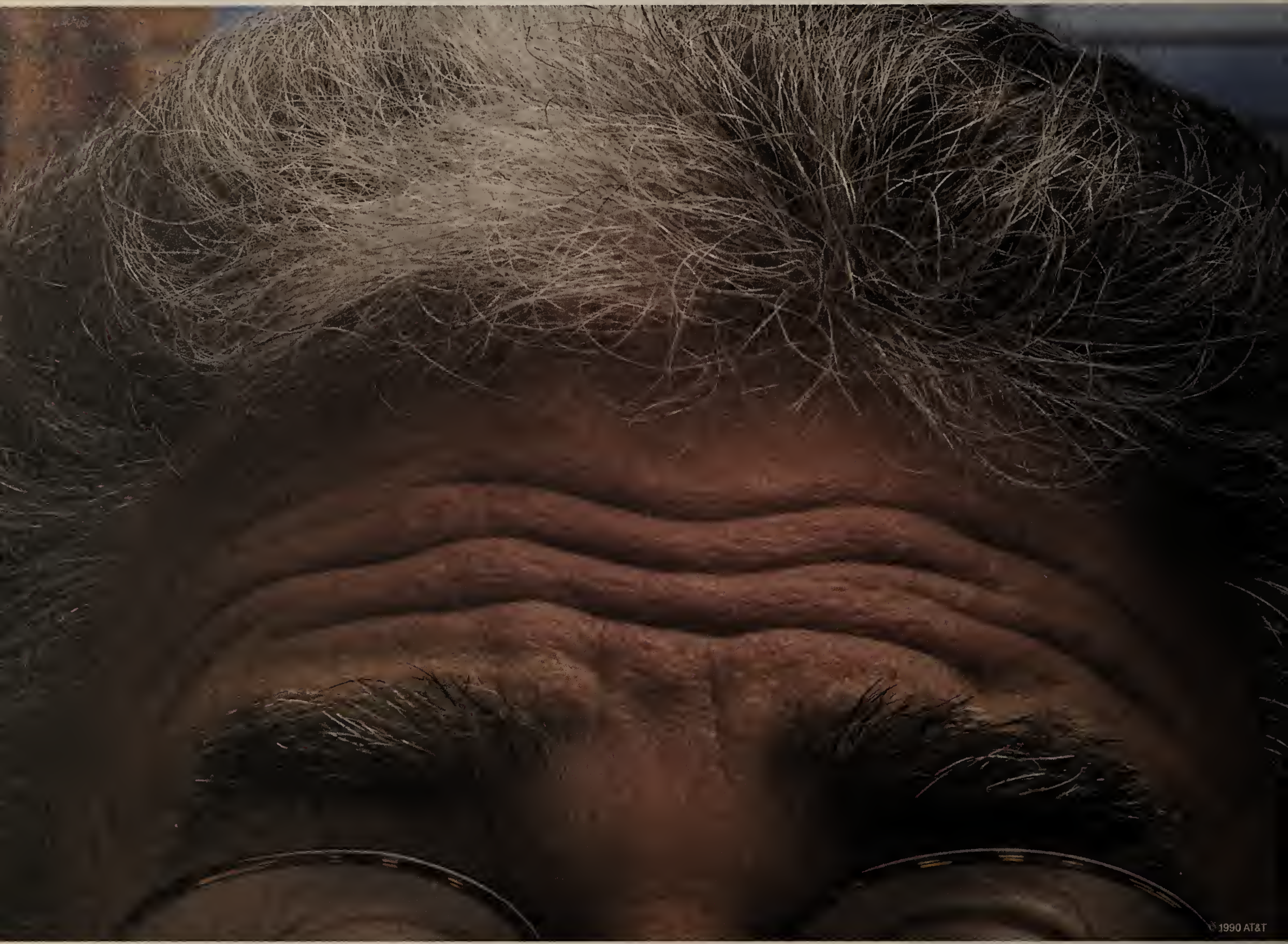
Several factors are contributing to the new attractiveness of image networks. One is the competition between image product manufacturers and the lower prices that result from it. Another is more powerful desktop processors. A third is the emergence of local-area network-based image management systems.

Developments in optical storage — particularly in write once, read many times

*(continued on page 41)*

Links to corporate data bases, standards drive imaging applications.

With AT&T, you'll never get these lines overseas.



Contrary to popular belief, worry and frustration aren't always standard equipment on international private lines.

When you're with AT&T, you've got a partner with over 60 years of international experience. Relationships with phone companies around the world. And AT&T representatives in 27 countries.

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We call this program AT&T Account Management Plus. It's an incredibly efficient way to manage your international private line. And we provide it to you at no extra cost.

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So before you make your next international call, call AT&T at **1 800 448-8600 ext. 222.**

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The right choice.

# New image buzzwords: JPEG and JBIG

By LYNN HABER

Two new international standards promise to have a significant impact on image networking. Together, they deal with transmitting and storing color and gray-scale image applications.

Proprietary products and the standard compression techniques of facsimile are used for current image compression and storage tasks.

But one of the two upcoming standards, known as the Joint Bi-level Imaging Group (JBIG) standard, is better than fax compression.

The other, the Joint Photographic Expert Group (JPEG) standard, is as good as some proprietary color and gray-scale products.

The main benefit of the standards is that they are likely to make different vendors' gear work together, thus increasing competition and lowering prices. Both standards deal only with still pictures. JPEG aims to be a general-purpose technique for applications as diverse as photo videotex, desktop publishing, graphic arts, color facsimile, newspaper-wire photo transmission and medical systems, among others.

JBIG will be used to compress bi-level images such as black-and-white photos or pages of text. The technique will be applicable to fax machines, offering superior image compression results compared to the CCITT Group III and Group IV fax standards (see Figures 1 and 2, page 55, for schematic representations of how JPEG and JBIG work).

While compression technology has been around for at least two decades, most implementations have been in high-end systems, which are costly and financially out of reach for many users.

The group that created JPEG has been working since the mid-1980s. It is a joint committee of the International Standards Organization and the CCITT.

*Haber is a Boston-based free-lance writer who specializes in computers and communications.*

### Compression technology

Both JPEG and JBIG are compression standards, necessitated by the large information content of photographic images.

For example, Allen Gersho, professor of electrical and computer engineering at the University of California, Santa Barbara, says an average picture contains around 2M bits of information.

To transmit such a picture using a 2,400 bit/sec modem without compression would take 833 seconds, or about 14 minutes, he says.

Transmitting that same picture using the JPEG algorithm with a 16-to-1 compression ratio would take about 52 seconds.

All compression techniques — for voice, data, image and video — involve eliminating certain repetitive data. In most transmission and data storage, a code for the repetition can be sent, rather than transmitting the same information over and over.

Image compression algorithms such as JPEG that eliminate redundant data are called "lossy," meaning that data is lost. In reality, the data is not lost; it is eliminated. The assumption behind lossy compression techniques is that some data in the file or transmission can be safely eliminated.

JPEG is a lossy image compression technique that proceeds on a pixel-by-pixel basis.

The resulting compressed image is reportedly indistinguishable from the original. However, if comparison is made between the bits that go in and the bits that come out, there is a difference.

An example of a lossless compression technique is facsimile. No data is lost in compression; hence, what you see is what you get.

Initially, the JPEG committee was trying to establish a single standard for image compression. But that was not possible, says C.J. Starkey, chairman of the U.S. delegation to JBIG and vice-president of Lexington, Ky.-based DataBeam Corp., a manufacturer of image communications equipment.

### Two fronts

"Continuous tone and bi-level images have very different and separate needs," Starkey says. Hence the launching of the effort to create JBIG.

The main difference between JPEG and JBIG is that the former deals with continuous-tone images, which are complex and dense by their nature. These ingredients allow for a lossy compression algorithm since pixels can be eliminated without the loss being perceived.

JBIG's bi-level compression, on the other hand, must be lossless; there can be no image distortion in this more simple type of image.

JBIG will eventually be an option for fax along with the current encoding of CCITT Recommendation T.4, which covers Group III fax, and Recommendation T.6, which refers to digital Group IV fax (known as Modified Modified Read encoding). But JBIG goes beyond current standards by taking advantage of newer technologies.

### An additional complication

In addition to the requirement that JBIG be more compression-efficient than either Group III or Group IV was the requirement for a lossless progressive encoding technique. Progressive encoding allows the image to be decompressed incrementally, for example, starting with a low-resolution rendition, which then builds up to a higher quality image as more data is decoded.

According to DataBeam's Starkey, there are two benefits to progressive encoding:

- A single common data base

*(continued on page 55)*

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*(continued from page 39)*

(WORM) drives — have reduced the cost of storing large volumes of image data.

And the once highly expensive process of scanning documents into image systems has been greatly improved.

Other factors contributing to imaging's increasing popularity include clarification of the legal status of stored images (see "A net manager's guide to imaging law," page 42) and improvements in image compression techniques (see "New image buzz words: JPEG and JBIG," this page), which will make image networking cheaper and faster.

### Looking back

New image configurations are vastly more flexible and powerful than older systems (Figure 1 on page 43 shows the typical work flow of an image processing system).

And they can be used across organizations. The image networks of two or more years ago were mostly used in individual departments to handle one very specific task — check processing, for example — and could not be used in entire enterprises.

> Today's nets have the potential to be corporatewide.
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Furthermore, systems were limited to a single function a few years ago. For instance, bank imaging systems could call up canceled checks but not bank statements. Often these systems were custom-built to a user's particular needs.

Today's image nets may be departmental, but they have the potential to become corporatewide. They can handle several different types of images and can be linked to nonimage applications.

For example, this latter capability allows the systems to call up an image file and compare it with an electronic mail file.

### Rushing into the mainstream

Industry analysts say several other factors are driving the push of networked imaging systems into the corporate mainstream.

There's the marriage of imaging systems with traditional data processing and MIS. This union allows companies to link image data with corporate data bases.

Next is the move toward imaging applications that run on existing off-the-shelf hardware, rather than dedicated image processing platforms and workstations. This greatly reduces the cost of a company's entry into imaging.

For these reasons and because the productivity savings of image networks have been documented, image networks are likely to become highly popular in the near future. BIS CAP International, a Norwell, Mass., market research firm, predicts the North American market for image management systems will grow at an average annual rate of 72% between 1990 and 1995. IDC predicts that the number of documents U.S. companies store on imaging systems will grow from 385 billion in 1990 to 800 billion in 1994.

### A proper British image net

One of the most extensive applications of image networking is taking place in the U.K. There, HFC is now installing an image management system that will link its customers' credit and banking records with images of checks and correspondence from each customer.

HFC's system illustrates the recent advances in imaging systems that are driving the market. Imaging was not even considered in the late 1980s, when the bank's network staff designed the network. "The network was designed to meet our traditional banking needs," says John Hogan, director of information technology at HFC.

"Then we saw we could run an imaging application on the system without changing things," Hogan adds. HFC will accomplish this by using an integrated image management system from Metafile Information Systems, Inc. of Rochester, Minn.

The bank set out in 1988 to convert its mainframe/dumb terminal-based banking records system to one based on IBM Application System/400 computers and local-area networks. Each of the bank's 173 branch offices will have an AS/400 and a token-ring LAN. The branches will be connected to regional data centers, each with AS/400s.

Images can be easily called up across HFC's network. When a customer calls with a question about his or her account — banks such as HFC process about 500 to 700 such queries per day, according to Hogan — the customer service agent asks for the name and account number. With this information, the agent is able to call up the person's account information.

In the electronic file containing this account information, a note tells the customer service representative there is an image file associated with this person's account.

Using the image system, customer service agents will be able to display simultaneously on one personal computer both the account data stored on the AS/400s and images of all correspondence related to the account stored on optical disks.

*(continued on page 42)*

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Another new user of image networking, Burroughs Wellcome, was encouraged to enter the field when it found that image applications could run on its existing processors.

Searching for a way to organize its documents, the pharmaceutical company decided to implement an imaging system to handle its estimated 2,500 pages per day of documents related to clinical trials of new drugs. Burroughs Wellcome wanted the imaging application to run on existing computer hardware and to use its existing network structure. The goal was to use an Ethernet LAN for high-volume image traffic and the existing token-ring net to deliver images to personal computers; Burroughs Wellcome had 1,000 IBM Personal System/2s and 2,000 personal computers.

The company chose Costa Mesa, Calif.-based FileNet Corp.'s WorkFlo Business System software that runs on IBM Personal Computers and compatibles. The WorkFlo software allows routing of image documents over the network to the proper editor. By enabling users to find all relevant documents on a particular subject, it also provides a useful tool when the Food and Drug Administration seeks reports. In addition, it helps manage the storage and retrieval of the documents.

### User benefits

Image systems can save money for companies that handle many paper documents. Savings are realized in two ways: through improved productivity and smaller storage requirements for archiving documents.

Image networks improve productivity by reducing the time spent filing, indexing and retrieving documents. The cost savings from the increased productivity vary with the type of business.

- Boston Financial Data Service's image network is estimated to increase its employee productivity by 30% to 40% ("User builds LAN-based image tool," *NW*, Feb. 26, 1990).
- In general, when image systems are properly used, they can decrease the average time it takes to complete document-related transactions by 50%, cut transaction volume by 50% and reduce office staff by 30%, according to estimates prepared by BIS CAP International.
- When image processing systems are used in the legal profession, where large numbers of documents are filed for every case, "the cost savings over manual document management is over 50%," says Mary Morrissy of Morrissy and McGuire, a Chicago firm specializing in legal documents.
- In the experience of banks, image management systems generally cut 30% off the time needed to process checks by traditional check processing systems, according to an IDC report.
- Banco Latino International, an international bank with offices in Miami, expects to save $50,000 per year in storage and retrieval costs by using an image management system to increase worker productivity, according to Oscar Marti, senior vice-president of Banco Latino.

An added benefit for Banco Latino will be lower international phone bills. Most of the bank's customers reside outside the U.S. Before installing imaging, when a customer called with a question about an account, bank personnel had to terminate the call, search through paper files, then call the customer back.

That meant Banco Latino was making one call for virtually every inquiry. The imaging system's speed in accessing documents allows customer service agents to answer questions while the customer is on the line.

Another productivity booster newer image processing systems offer is computer-assisted indexing. An example of this is currently at work at the Los Angeles Department of Water and Power. The department estimates that the image application saves the hundreds of thousands of hours it previously took to index and search for documents manually.

The department uses its LaserFiche image system — developed by Compulink Management Center, Inc. of Torrance, Calif. — to manage all of its litigation department's contracts and correspondence.

The significance of this configuration is in the way it links image processing with optical character recognition (OCR).

Images are retained, but the

## A net manager's guide to imaging law

For users who wonder about the legal status of images, certainly a valid question before investing in image networks, the good news is that the law accepts images as replacements for stored original documents. Unfortunately, legal experts say there are caveats.

The main purpose of imaging networks is to eliminate paper. Checks, letters and photographs are all scanned into the system, compressed and stored — usually on optical disks. Most paper originals are eventually destroyed.

Can the image, or a printed version of the image, be accepted in court? Yes, but clouding the answer, legal experts say, is a principle known as the Best Evidence Rule. The gist of the rule is that when a written document — for example, a check, handwritten letter or typed letter with a signature — is at issue in a trial, the original (if it exists) must be brought into court as an exhibit.

"But the rule has many exceptions," explains Benjamin Wright, a Dallas attorney who specializes in the legal issues associated with electronic data storage, transmission and retrieval.

At the federal and state levels, statutes dictate when a copy of an original document can be used in court. The federal statute is the Federal Business Records Act; the state statute commonly used is the Uniform Photographic Copies of Business and Public Records as Evidence Act (referred to as UPA).

For example, the UPA says copies created in the regular course of business are "as admissible in evidence as the original itself in a judicial or administrative proceeding, regardless of whether or not the original is in existence."

Optically stored image documents fall within this law's language and should be admitted as evidence, says Robert Williams, president of Cohasset Associates, Inc., a Chicago-based records management consulting firm. He is also editor of a legal research study, "Legality of Optical Storage," which is available through Cohasset Associates by calling (312) 527-1550.

However, as with many legal issues, there is room for interpretation.

Although there is a solid legal foundation for admitting documents stored on imaging systems, this does not guarantee the admissibility of material from every system, Williams says.

"Sure, the courts should accept this type of evidence," Wright adds. "But companies will have to satisfy several conditions to ensure acceptance." In addition to the Best Evidence Rule, legal experts say courts look for three conditions to be satisfied: The evidence must be accurate, reliable and trustworthy.

Therefore, legal experts advise companies using imaging systems to establish procedures that will demonstrate that documents are accurate and reliable if a legal dispute arises. Wright suggests written procedures be maintained describing the process of how documents are archived and stored and that the archiving staff keep a log of each day's activities to demonstrate that they follow the procedures.

If there is ever a question in court as to whether the evidence on the imaging system is reliable, a company can point to these controls. "They can say: 'Look at all of these controls we had in place to prevent mistakes and errors,' " Wright says.

— *Salvatore Salamone*

> The gist of the rule is that when a written document is at issue in a trial, the original must be brought into court as an exhibit.

▲▲▲

OCR application also reads the document once it has been scanned into the image data base.

The system then uses the words read by the OCR application to automatically index the document, without human data entry or even human selection of the filing parameters.

Why does the department use OCR only for indexing? Why doesn't the OCR system just transform the entire document into an electronic file? The reason is that OCR technology has a success rate of only 90% on average. Thus, it is not reliable for legal purposes because some words in the document may not be properly identified.

The introduction of image processing can be a major step for an organization. Office automation experts and experts in work group interaction say that when image processing arrives in a department or enterprise, changes in work flow, job content and work habits generally follow.

But the experts also say organizations have to make their own detailed plans for working arrangements after the introduction of image processing. Without such plans, they say, organizations cannot expect optimal improvements in productivity.

"Senior management has to articulate a clear strategy of what they expect to gain from the introduction of these systems," says Lois Bruss, program manager for sociotechnical consulting at Wang Laboratories, Inc. in Lowell, Mass.

"Companies shouldn't expect the purchase of technology alone to bring them innovation," she says. "They may only get incremental improvements."

Bruss says that simply installing a new imaging system could make each department more efficient. But far greater gains could be realized by adopting the image system to best handle the flow of documents. She recommends that users conduct a survey of document flows before adding image processing.

For example, one company found that by using an image processing system, it could combine three departments — billing, order taking and accounts receivable — into one, Bruss says.

In this firm, all orders, invoices and canceled checks were formerly processed and stored separately. With the introduction of the imaging system, all the documents were stored on the same system.

Since the documents could be accessed from any workstation, the company found that by retraining workers to handle all three job functions, the departments could easily be merged, Bruss says. In turn, the merger meant that fewer staffers were needed to handle the same functions.

This combining of jobs is common when imaging systems enter a company. Making documents available to people outside of the department where the documents are generally stored makes it easier to spread the duties around.

"Senior management needs to consider the organizational issues that come with imaging technology to make a quantum leap in productivity improvement," Bruss says. If upper management does nothing, the introduction of an imaging system will make each department a little more efficient. However, if upper management sees the potential, it can reorganize the company by combining departments.

### The future is WANs

At this point, the vision of image networking meets a real bottleneck. New lower cost imaging systems are attractive. But there are difficulties hooking up local-area imaging networks to wide-area networks.

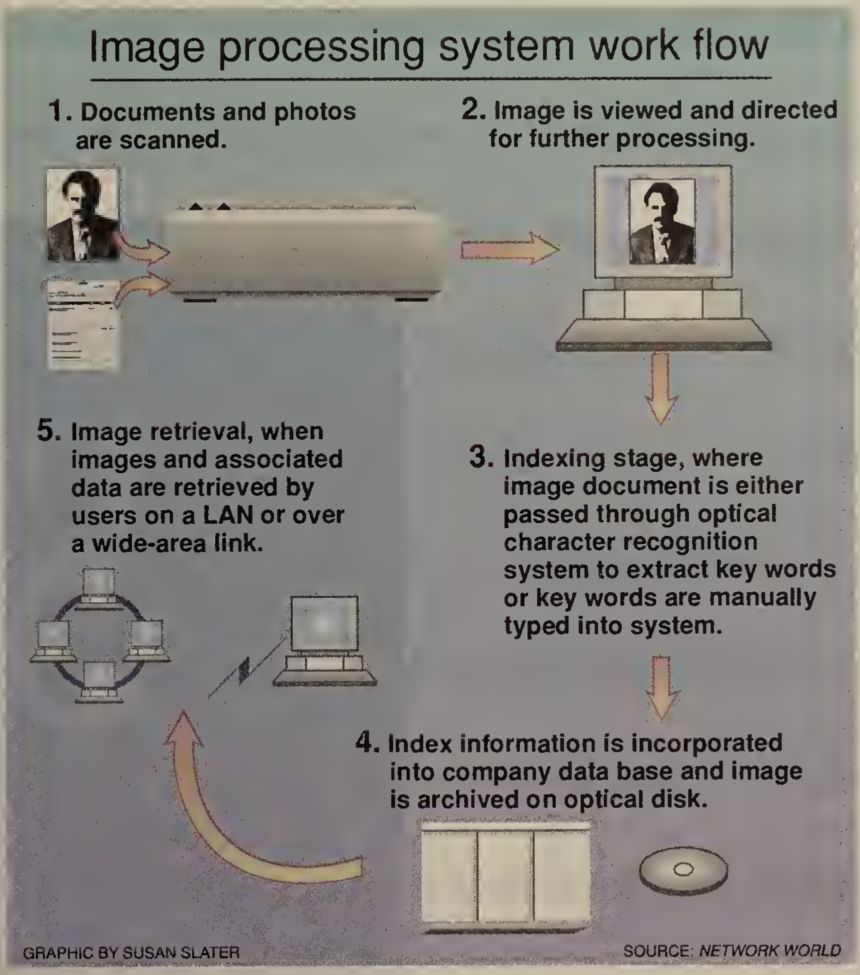

Image processing system work flow

1. Documents and photos are scanned.
2. Image is viewed and directed for further processing.
3. Indexing stage, where image document is either passed through optical character recognition system to extract key words or key words are manually typed into system.
4. Index information is incorporated into company data base and image is archived on optical disk.
5. Image retrieval, when images and associated data are retrieved by users on a LAN or over a wide-area link.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

Some networks transmit black-and-white images, usually of documents, through facsimile cards that are connected to hosts or personal computers.

Facsimile and fax servers are an elementary form of image networking. But the term is primarily used to mean an extensive data base of images.

Transmission by fax does not limit image networks to storage in fax servers, but Group III fax transmission is usually a slow procedure — running 30 to 40 seconds per page, depending on the document's compression.

A more detailed, dense document cannot be compressed as much as a document with little writing on it. Group IV, with transmission rates as fast as five seconds per page, is still in its infancy, and the dial-up digital circuits that would make it attractive are not yet universally available in the U.S.

However, when completed, the pending international image compression standards — Joint Photographic Expert Group (JPEG) and Joint Bi-level Imaging Group (JBIG) — will offer improved compression, thus making transmissions over ordinary telephone lines more economical.

For campus-type imaging applications, LANs based on the 100M bit/sec Fiber Distributed Data Interface standard are likely to be used. Indeed, some medical centers, including New England Medical Center in Boston, have already ordered FDDI LANs.

Users that need to send images over a regional area may get some help from new metropolitan-area networks. Some alternative or bypass carriers — Metropolitan Fiber Systems, Inc., for example — currently offer fiber optic-based high-bandwidth services in many cities.

Another aid will be metropolitan-area networks based on the IEEE 802.6 standard. The 802.6 standard has provisions for high-speed — 45M bit/sec and higher — packet-switched services for data and image traffic. Trials of the 802.6 standard, under the regional Bell holding companies' trade name, Switched Multimegabit Data Service (SMDS), are already under way. Reports indicate that some RBHCs plan to tariff SMDS services by the end of this year.

Other options for long-distance transmission of images are, of course, the dedicated circuit-switched telephone services, of which the highest bandwidth is T-3 (45M bit/sec) and the next is T-1 (1.544M bit/sec). Then there are fractional T-1 circuits and a gamut of switched services, including switched 56K bit/sec circuits.

Last year, AT&T announced switched 384K bit/sec circuits and the impending switched 1.544M bit/sec circuits.

For high-resolution or high-volume image transmission requirements, users may have to investigate one or more of the high-speed LANs and packet-switched services that are starting to appear. Already, operators of some hospital image networks are discussing creating links between their planned FDDI backbones over SMDS.

Thus, while imaging's high-bandwidth requirements have restrained its application across wide-area networks until now, there are starting to be signs of a change.

Of course, enterprisewide image networks cannot be fully utilized without training and perhaps some changes in corporate organizations. But the efficiency and improved customer service that speedy access to comprehensive data bases of documents will allow is likely to make image networks popular.

When the productivity gains that image networking can bring spread across an enterprise, the era of image networking will have arrived. ◪

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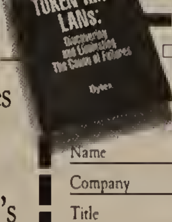

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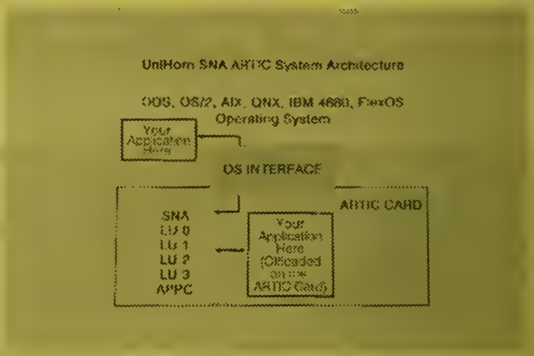
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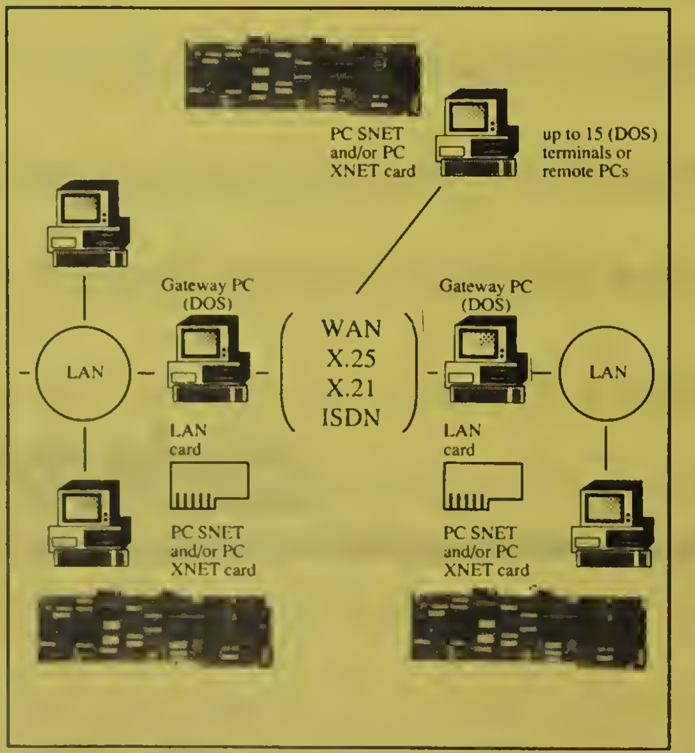
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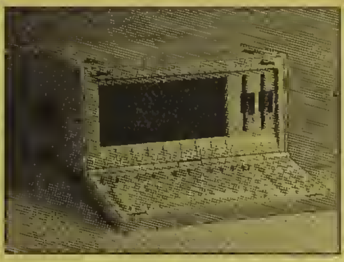

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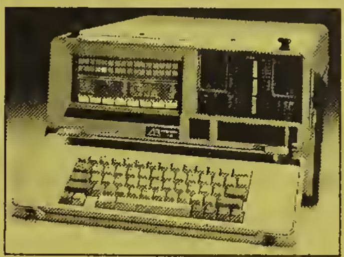

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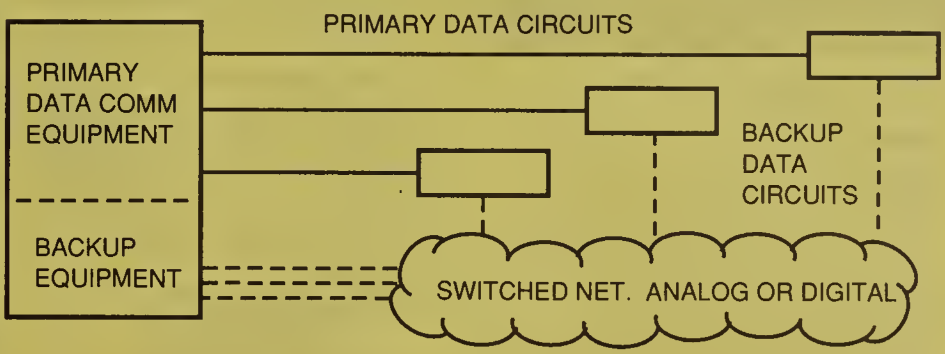

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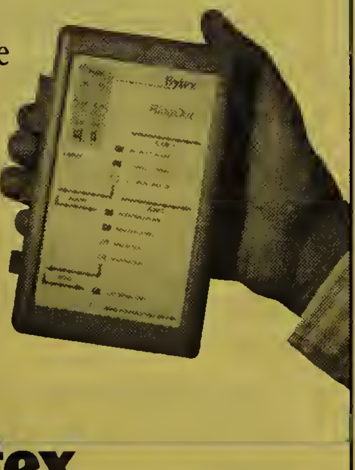

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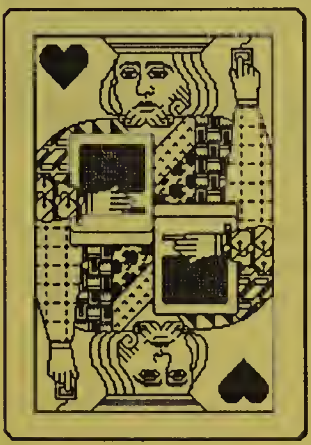

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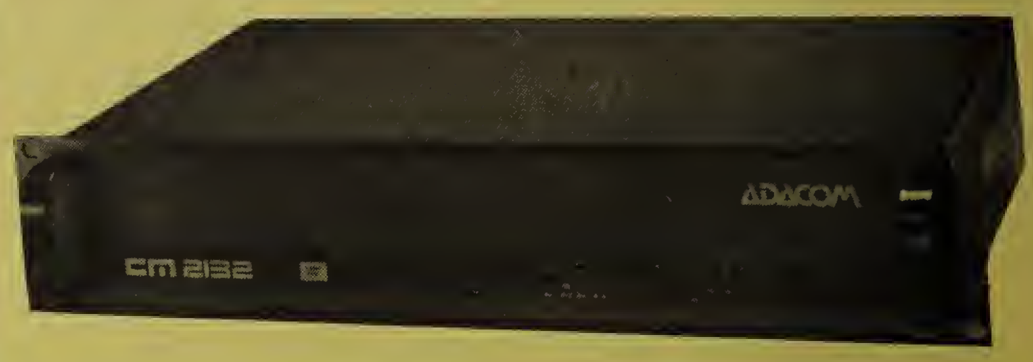

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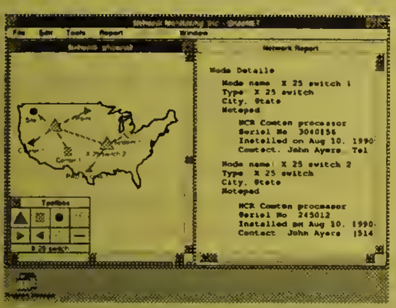
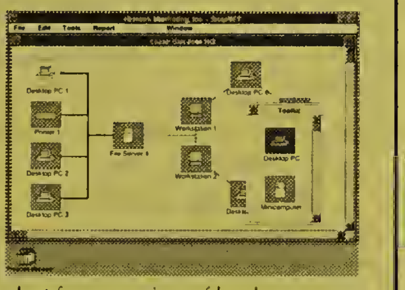


Place a node or link simply by pointing and clicking. WAN and LAN reports will give you complete summaries.



Use the toolkit to create and configure your local area network. You may select from a variety of hardware icons (e.g., PC, printer, mainframe, fileserver, etc.).

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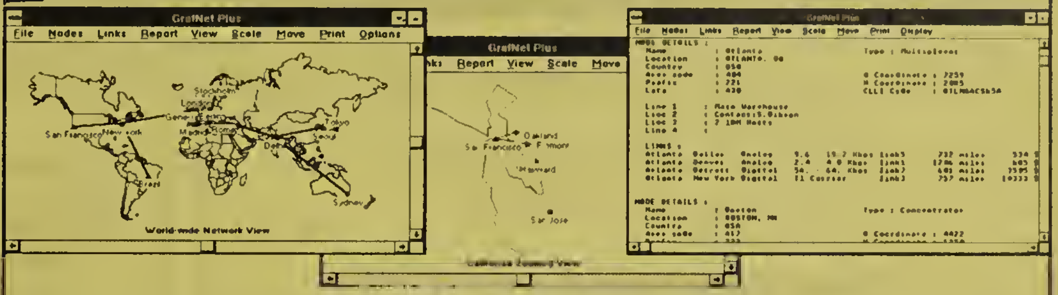

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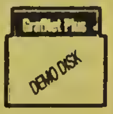

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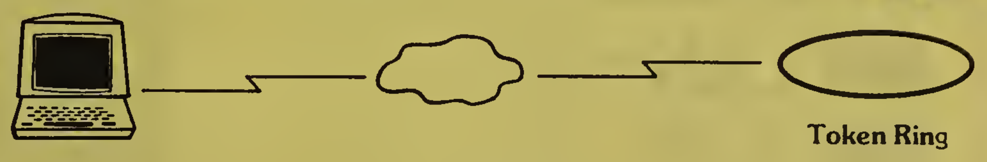

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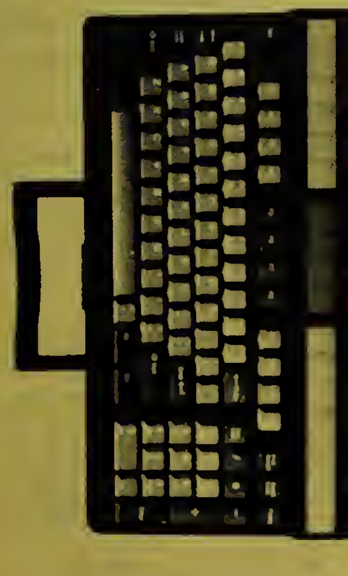

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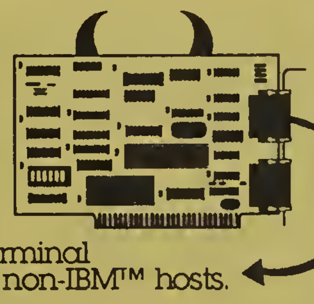

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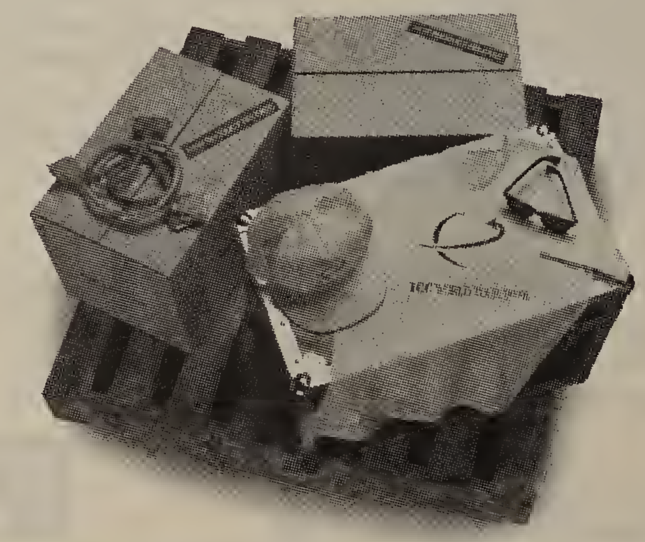

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For more information or the list of headings, call Eleni Brisbois, Resource Directory/Project Manager at 1-800-622-1108 or 508-875-6400.

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March 18
1. Evaluating ISDN options
2. Comparing tariff information services

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Buyer's Guide: Electronic mail software and services

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Trends Reshaping Networks: EDI

April 8
Buyer's Guide: LAN operating systems

April 15
Standards update

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Buyer's Guide: X.25 packet switches
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May 13
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May 20
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May 27
SNA Update

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# AT&T introduces the biggest thing to hit contact lens sales since shag carpeting.

AT&T Integrated Services Digital Network (ISDN) gave Bausch & Lomb the capability to take 1,000 more orders per week.

Ask most people what AT&T ISDN has to do with the contact lens business and they'll probably tell you it's the first line on the eye chart. But if you ask the people at Bausch & Lomb, they'll tell you about a digital technology so innovative, it lets them answer a lot more calls using the same number of live operators they had before.

Not too long ago, Bausch & Lomb's customer service center was getting a lot more calls than they could handle. Realizing that lost calls can turn into lost customers, they called AT&T for help.

Through AT&T ISDN, Bausch & Lomb got a feature called Automatic Number Identification (ANI). With ANI, their computers can automatically capture each caller's phone number and match it to the customer's record. The end result? Call handling time has been cut by an average of four seconds per call. Which means Bausch & Lomb's customer service representatives can now handle about 1,000 more weekly calls than they could before.

So if you've been looking for a way to boost sales without taking on more overhead, call off the search. AT&T's contact lens solution could be the answer for your business, too.

*Innovation. Another AT&T advantage.*

For more information about AT&T ISDN, call your AT&T Account Executive or 1 800 247-1212, Ext. 144.

**AT&T**
The right choice.

# New image buzzwords

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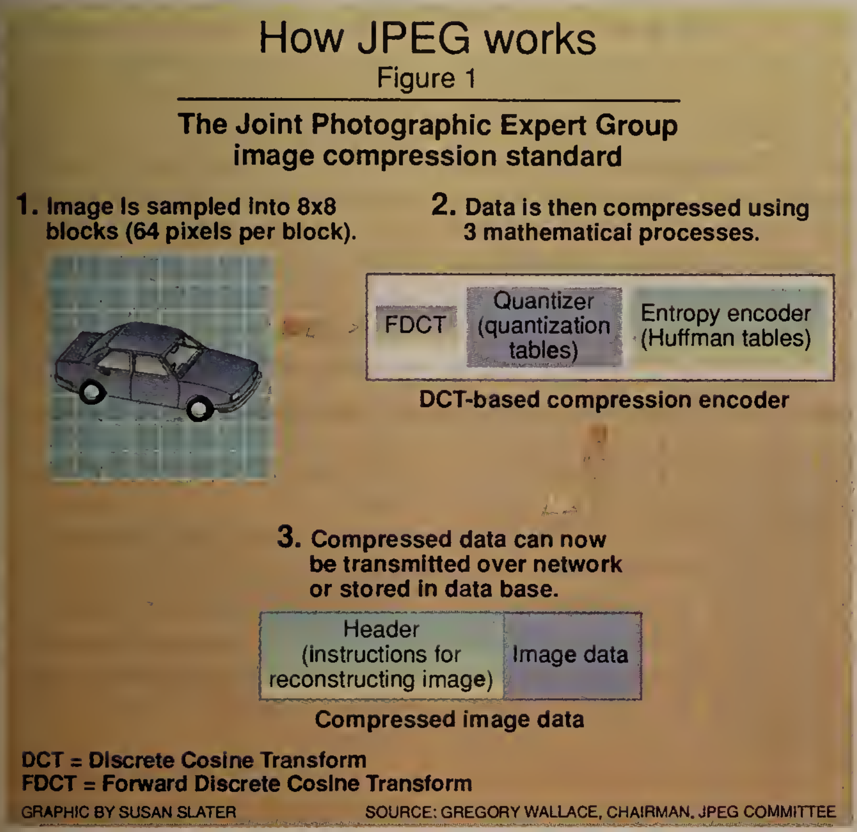
can efficiently serve output devices with widely different resolution capabilities.

- It enables subjectively superior image browsing on a computer screen over low- and medium-rate communications links.

JBIG handles both sequential (left to right, top to bottom) and progressive (image buildup, as on a CRT) encoding, whereas today's facsimile incorporates a sequential scheme only.

Progressive and sequential encoding are components of JPEG as well.

JPEG has multiple modes of operation but features a core mode known as the baseline system. This is common to all other modes of operation and is expected to be sufficient in its own right for several applications.



How JPEG works

Figure 1

The Joint Photographic Expert Group image compression standard

1. Image is sampled into 8x8 blocks (64 pixels per block).
2. Data is then compressed using 3 mathematical processes.
FDCT
Quantizer (quantization tables)
Entropy encoder (Huffman tables)
DCT-based compression encoder
3. Compressed data can now be transmitted over network or stored in data base.
Header (instructions for reconstructing image)
Image data
Compressed image data

DCT = Discrete Cosine Transform
FDCT = Forward Discrete Cosine Transform

GRAPHIC BY SUSAN SLATER

SOURCE: GREGORY WALLACE, CHAIRMAN, JPEG COMMITTEE

There also exists an extended system to provide support for lossless compression, says Eric Hamilton, a JPEG committee member and senior scientist at San Jose, Calif.-based C-Cube Microsystems, Inc., a multimedia very large-scale integration manufacturer.

The baseline system is a sequential system based on 8- by 8-pixel Discrete Cosine Transform (DCT), which is the main component of JPEG.

During the transform encoding, the picture is sampled horizontally from left to right and vertically from top to bottom in 8- by 8-pixel blocks (64 pixels per block). Each pixel uses 8 bits to specify a single component of a source image. The removal of redundant data is accomplished using the DCT.

The second step of operation of the JPEG algorithm, called quantization, removes additional information. This step in the process is optimized for the human visual system.

Entropy encoding is the final step. It achieves additional compression without additional loss of image quality by discarding data that is not visually significant. Entropy encoding in the baseline system is achieved by using variable-length encoding or Huffman encoding, a data compression technique in which frequently occurring characters or data patterns are replaced by shorter bit patterns, thereby reducing the overall number of bits to be transmitted.

If more compression or greater pixel precision is needed, the extended system offers arithmetic encoding as an alternative to Huffman encoding. However, this technique is more complex.

### Progressive operation

A second feature of the extended system is progressive operation. Two techniques of progressive operation are progressive encoding and hierarchical encoding. In progressive encoding, each image component is encoded as multiple scans rather than as a single scan, thereby allowing the image to be built up from low to high resolution.

As applied to an image data base application, for example, a user might scan a data base and find an image in low resolution. Later, the user could choose to make that image assume a higher resolution.

### Hierarchical encoding

Hierarchical encoding provides pyramidal encoding of an image. It is useful in applications in which a very high-resolution image must be accessed by a lower resolution device that does not have the buffer capacity to reconstruct the image at its full resolution.

Hierarchical encoding scales down the image for the lower resolution display.

An example is an image scanned and compressed at high resolution for a very high-quality printer but which must also be displayed on a low-resolution personal computer monitor.

Finally, JPEG includes an independent lossless function that is not DCT-based. It does, however, guarantee excellent fidelity with exact recovery of every source-image pixel value, in spite of a relatively poor compression rate compared with lossy compression.

A medical application in which, for legal purposes, there can be no loss of image is an example of why someone would want to use the independent lossless function in the JPEG specification.

### Error protection

According to C-Cube's Hamilton, JPEG paid little attention to being robust to errors. Therefore, users need to run an error protection protocol, such as Synchronous Data Link Control or X.25, on top of JPEG. JPEG is able to recover some errors, but it cannot repair them in the resultant image, Hamilton says.

### A practical look

While JPEG and JBIG both address image compression, they have very little in common technically. Although, according to DataBeam's Starkey, they overlap in some application areas.

For starters, both JPEG and JBIG are tool kits and not end-user standards. In other words, they will be incorporated in application standards — for example, the tagged image format file data base standard. JPEG will address continuous-tone image compression, while JBIG will address bi-level image compression.

Fax and multimedia applications are other examples of applications that can be wrapped around the emerging standards.

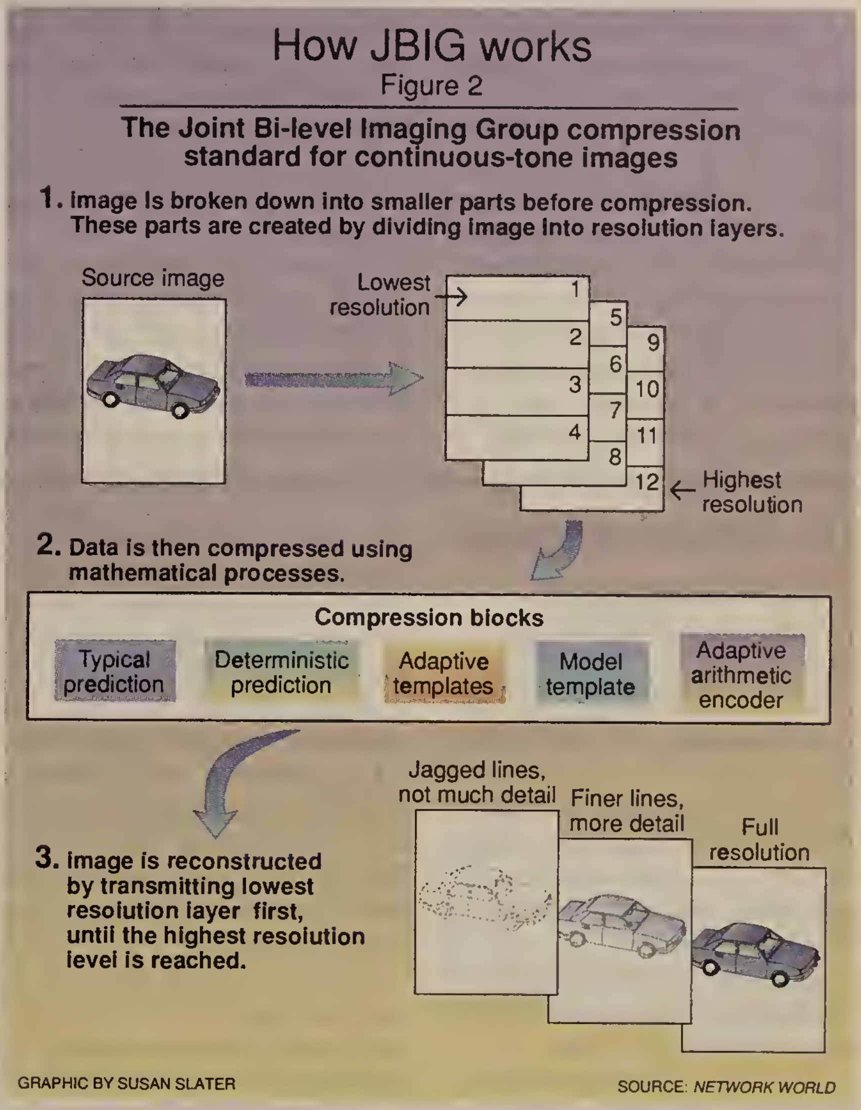
"In an application such as a data base, JPEG and JBIG will be used together because the content is likely to contain both image and text," Starkey says.

Currently, there are no available JBIG implementations. However, Starkey says, a variety of vendors are interested in using the proposed standard. These include AT&T, DataBeam, Eastman Kodak Co., Hewlett-Packard Co., IBM, Mitsubishi Corp. and NEC America, Inc.

A final version of the international JBIG standard is about 18 to 24 months away. JPEG, on the other hand, is closer to realization. The committee said it hopes JPEG will be an international standard by year end.

Several vendors have already introduced JPEG-compatible products. C-Cube, for example, has introduced the CL550 single-chip JPEG processor and development boards for the Apple Computer, Inc. Macintosh Nubus and IBM Personal Computer AT bus, Hamilton says.

Storm Technology, Inc., a Palo Alto, Calif., developer of digital image processing technology for the personal computer market, has introduced PicturePress, image compression software for the Macintosh, and PicturePress Accelerator, a Nubus card that accelerates image compression on the Macintosh.



How JBIG works

Figure 2

The Joint Bi-level Imaging Group compression standard for continuous-tone images

1. Image is broken down into smaller parts before compression. These parts are created by dividing image into resolution layers.
Source image
Lowest resolution
1
2
3
4
5
6
7
8
9
10
11
12
Highest resolution
2. Data is then compressed using mathematical processes.
Compression blocks
Typical prediction
Deterministic prediction
Adaptive templates
Model template
Adaptive arithmetic encoder
3. Image is reconstructed by transmitting lowest resolution layer first, until the highest resolution level is reached.
Jagged lines, not much detail
Finer lines, more detail
Full resolution

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

With image communications increasing in importance, the new standards — and their likely product implementations — should enrich current image applications and spur the creation of new ones as well. ◻

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# Letters

*continued from page 37*

digital PBX can be upgraded in the field to up to 672 ports.

Mitel introduced automatic call distributor (ACD) software in 1988. ACD software running on either of these Mitel SX-200 PBXs could easily have handled Astro's 1,300 to 1,800 inbound calls per day.

It is unfortunate for Astro that they did not know about the upgrading opportunities for the Mitel SX-200 PBX.

Neil Weber
Director of U.S. marketing
Mitel, Inc.
Boca Raton, Fla.

*Author's response:*

*In saying that my article contained incorrect information, I assume Mr. Weber is referring to the statement that the switch "could not be expanded." If Mr. Weber thinks that "expansion" is gutting the racks and replacing the electronics, then he is entitled to his view.*

*Mr. Weber's contention about cost-effectiveness is presumptuous. I have never heard of him, nor has he ever spoken with me. He has absolutely no knowledge of our configuration, nor of our needs.*

*Astro did indeed entertain more than one proposal for Mitel products. It should also be pointed out that Astro had a substantial investment in Mitel's proprietary telephones. This investment would have, all things being equal, predicated a continuation of our involvement with Mitel.*

*The fact is, however, that all things were not equal. I would like to stress that in my article, I studiously avoided any reference to our experiences with Mitel's products, dealers and especially service. Please allow me to state here that they were far from positive.*

*It is a fact that, in the PBX market, Mitel's products are about average in price. Yet when assessing cost, after 20 years in telecommunications, I have learned to look beyond the price of the iron. I seek and demand quality and, even more, I demand quality of service.*

*Astro found not only a cost-effective telecommunications solution, but also both quality and quality of service in Pacific Bell and Centrex.*

*It is my humble suggestion that Mr. Weber's concerns about upgrading should be focused on upgrading the quality of his dealer network.*

*David Sabo*
*Group IV marketing specialist*
*Facsimile division*
*Astro Office Products, Inc.*
*Gardena, Calif.*

# Firms unite in OSI effort

*continued from page 4*

X.400 messaging standard, the File Transfer, Access and Management (FTAM) standard and possibly the X.500 directory specification, according to Barzel.

It has not been determined how the companies will be physically linked to one another.

Examples of the applications that may be developed include those used during an OSI demonstration at last year's Hannover Fair CeBIT show in Hannover, Germany, he said.

For that demo, nine user companies helped develop mock applications in banking, manufacturing and office productivity, as well as one in which multiple chemical companies exchanged product data over an OSI network in a joint proposal to a client.

Once the applications are agreed upon, each participating company will begin writing application code that will work with the OSI application-layer protocols.

For example, Barzel said banks such as BNP will likely be interested in various funds transfer and credit advice applications written on top of X.400, possibly using electronic data interchange standards.

Then the focus will be on getting the user-written applications to work with one another.

Barzel said user efforts should be concentrated on the applications that use OSI protocols such as X.400 and not on interoperability of different vendors' OSI products.

"A user should be taking X.400 interoperability for granted," he said.

An array of vendor equipment is likely to be used in the project, Barzel said, although he declined to name specific companies at this stage.

"I don't think any large ones will be excluded," he said.

The applications will be developed during the next few months, and the first links between participating companies are expected to be established by the beginning of the summer.

There is no time frame for when the project will end because it is expected to continue growing, he said.

# US Sprint widens ISDN support

*continued from page 4*

Those customers include Centel Corp., Domino's Pizza, Inc., Matrixx Marketing, Inc. and Northern Telecom.

Users can access US Sprint's PRI service through any of the carrier's 283 POPs and only pay the cost of accessing the nearest POP.

The carrier pays for delivery of the PRI link to the nearest PRI-equipped switching node.

Offering PRI from two switches was an early ISDN strategy for US Sprint, analysts said.

"That strategy allowed them to find out what the market was without offering PRI from all of the switches in its network," said Ian Angus, president of Angus TeleManagement Group, Inc., a Pickering, Ontario, consultancy specializing in ISDN.

Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy, said, "PRI is a high-end service and new from a support standpoint. By bringing PRI up on a few switches, US Sprint had time to train its service and support staff."

US Sprint was the second U.S. long-haul carrier to offer PRI service, which became available in April 1990. AT&T was the first.

US Sprint's PRI offering can be used to access a variety of services, including Ultra 800, Ultra WATS, VPN and the carrier's switched digital services. PRI carries a $2,000 onetime installation charge and a $300 monthly fee. Its automatic number identification features carry a onetime $200 installation charge per PRI and 1 cent for each number delivered.

US Sprint's Call-by-Call Service Access feature has a $250 per-PRI establishment fee, and users pay $200 each time they rearrange their trunk group. This feature allows users to reconfigure B channels to support different services.

VPN-PBX interworking carries a $100 onetime installation charge per site and is designed for VPN users with ISDN-compliant Northern Telecom private branch exchanges. It lets users identify callers behind PBXs.

# Nets help firms react swiftly

*continued from page 29*

When it comes to implementing new technologies, United Parcel Services, Inc. (UPS) views speed of implementation as more important than cost, said Steven Heit, manager of information services planning at UPS in Paramus, N.J.

"Time is the competitive edge," Heit said. "The time it takes to implement a system is the single largest factor driving our purchases, even more than cost. The faster we get applications up and running, the bigger and quicker our payback."

This emphasis on speed often means UPS will purchase commercially available software, rather than develop a product inhouse that could be more suitable or robust.

For example, four years ago, the firm decided to purchase a commercially available E-mail package to serve its 2,500 sites worldwide rather than develop its own. The vendor package didn't have all the features UPS wanted, but the company decided enhancements could be added later once the system was operational.

UPS' E-mail system now supports 14,000 employees worldwide who send and receive more than 200,000 electronic messages a week. It has significantly reduced the amount of paper that is routed throughout the company and helped employees transcend time zone differences, Heit said.

"We bought a commercial package because it could be brought up quicker and allowed us to begin deriving benefits quicker," he said.

UPS has since encouraged the original vendor to incorporate into the next release of the software additional features such as directories that are synchronized across multiple nodes, Heit said.

Some companies find that the quickest way to deploy new applications and technologies is to work with only one vendor.

GE Capital Fleet Services, for example, is speeding the implementation of mission-critical cooperative processing applications by standardizing on products from IBM under Systems Application Architecture.

To support cooperative processing, the company has had to revamp its entire information systems architecture, swapping out Honeywell, Inc. mainframes for multiple interconnected IBM Token-Ring Networks supporting IBM Personal System/2 workstations and Application System/400 minicomputers.

Such an immense project would usually take many years to accomplish, but the company set a two-year timetable to complete the systems overhaul, which began in 1988, according to Larry Runge, director of advanced systems and technologies at the firm in Eden Prairie, Minn.

"We set an accelerated schedule so we could put in place systems that were far superior to anything our competition had," Runge said.

To keep up with the accelerated schedule, however, GE Capital Fleet Services found it necessary to stick with one vendor, rather than risk delays due to finger pointing among multiple vendors whenever problems arose, Runge said.

"We could have saved money up front if we had bought products from different vendors, but that would inevitably have bogged down the process," Runge said. "We decided that speed was more important than cost."

# Women still face hurdles

*continued from page 29*

Connie Pottenger, telecommunications director for Indiana University/Purdue University at Indianapolis Medical Center, said women must also develop a gender-blind attitude.

"It's useless to concentrate on your gender in the professional world or to blame sexism for every obstacle or setback," she said. "Concentrate instead on whether you have the necessary skills, experience and education to achieve a management position.

> "It's useless to concentrate on your gender in the professional world or to blame sexism for every obstacle or setback."
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"I'm certain sexism still exists," she added, "but I've found throughout my career that most people focus on whether you can do the job, not whether you're male or female."

Many said women can increase their visibility by becoming more involved in professional organizations. "It's not enough to be a member of a user group," Todus said. "You have to seek out leadership positions in those organizations."

Pottenger added that the chances of reaching top network positions are improved for women who work at large organizations that have major net operations. "When you work for a large corporation with an extensive network, you can rotate your experiences and not get boxed into a job you'll never be able to get out of," she said.

Most of those interviewed agree that women entering the network field can look forward to a bright future.

"We're on a roll now, and it's no longer difficult to keep the momentum going," Todus said. "By combining skills, experience and some initiative, I'm convinced there's no limit to how far women can go in this field."

# Firm releases upgraded ware

*continued from page 35*

Version 2.2 of TCPware for VMS also provides significant hooks to IBM networks, enabling users on DEC TCP/IP networks to emulate IBM 3270 terminals. This allows users to access IBM or DEC applications via the same terminal, Volz said.

Basically, Process Software added TN3270, an IBM 3270 terminal-emulation service that works in tandem with Telnet virtual terminal software, enabling users to conduct 3270 sessions via Telnet connections to an IBM host also supporting TCI/IP and Telnet.

TCPware for VMS also includes support for the Simple Network Management Protocol, Domain Name Services (as used in the Internet), the Serial Line Interface Protocol routing protocol and DECwindows.

Version 2.2 of TCPware for VMS costs $1,000 for a VAXstation 3100. Other prices vary depending on system and configuration. The software is scheduled to ship in mid-March.

For more information, contact Process Software at 959 Concord St., Framingham, Mass. 01701, or call (800) 722-7770.

# Server is SPARC-compatible

*continued from page 35*

RS-423-A ports, an external Small Computer System Interface, MIT's X Window System, Solbourne's X Window Manager, Sun's SunView and X11, a C language compiler, an industry-standard seven-slot VMEbus that operates at 25M byte/sec and Transmission Control Protocol/Internet Protocol support.

Lockheed Corp. of Titusville, Fla., recently bought a Solbourne Series5E/800i with four CPUs and 32M bytes of memory for use in its development of a launch test training system (LTTS) for the National Aeronautics and Space Administration, according to John Wilkens of Spectrodyne, Inc., a Tallahassee, Fla., reseller of Solbourne equipment.

The purpose of the LTTS, which uses the X Window System, is to train launch room operators on the new screen technologies that will be used in a NASA project that will replace all existing launch processing systems with standardized systems running Unix.

The Series5E/800i that Lockheed is using is part of a TCP/IP-based Ethernet backbone linking seven other dual-processor Solbourne systems.

The Series5E/800i ranges in price from $74,900 to $450,590 depending on the number o CPUs and the amount of memor required (see graphic, page 35).

For more information, writ to Solbourne at 1900 Pike Road Longmont, Colo. 80501, or cal (303) 772-3400.

# Users lament inflexibility

*continued from page 1*

"I'd have to give AT&T a check minus for new ideas [under] flexibility of new service integration," said Paul Singer, communications planning manager for USAir, Inc. in Washington, D.C. "Overall, innovation in this area has not been high."

The airline signed a five-year, $22.6 million Tariff 12 contract early last year.

It is still working to bring under its custom network arrangement an AT&T 800 service routing feature announced shortly thereafter, said Singer, who has been a force in the formation of a Tariff 12 user group.

Paul Singer

Some users say AT&T promoted rapid access to new technologies and services in marketing Tariff 12 but that the carrier hasn't delivered on its promise.

"That just didn't materialize for us," said Russell Bowen, telecommunications director for Aetna Life and Casualty Co., which signed a three-year, $10 million Tariff 12 in 1989. "We actually get new services behind other companies that aren't Tariff 12 [customers]."

Aetna is pushing AT&T for improvements, Bowen said. "We're starting to ask them about new technologies and services, and how to get them as early as possible."

### Long refiling process

To incorporate new offerings in custom network arrangements, AT&T must refile customer options with the Federal Communications Commission. The refiling process has to be used to change or amend the original contract, and that takes at least 45 days and often several months.

AT&T acknowledged that the refiling process delays the addition of new services for Tariff 12 users.

"It's a frustration we share with our customers," a spokesman said. "We believe the FCC is looking at what they can do to streamline this."

AT&T claimed, however, that it provides custom net users with advanced technology and services ahead of other users.

"We consider these partnerships to be strategic, and these customers are getting state-of-the-art technology from us," the spokesman said.

But some industry watchers disagree.

"The impression that many [users] are left with early on is that this is your way to have an inside track to what's coming down," said Liza Draper, a release manager with Network Equipment Technologies, Inc., a Redwood City, Calif., T-1 multiplexer vendor. "But you can't realistically expect it to be a true strategic partnership as the number of Tariff 12 customers climbs toward 100. In actuality, from the AT&T standpoint, this is a way to ensure that revenue is guaranteed for several years." Some Tariff 12 users, including General Electric Co., have had to add new services outside the scope of their custom network arrangements.

AT&T partnered with GE to develop Bandwidth Management Service (BMS), which AT&T announced in mid-1988. But according to Stanley Welland, telecommunications manager for GE, the service is used and paid for outside the company's Tariff 12 deal, signed in 1988.

"Users have to remember that not all tariffed services are available under Tariff 12," Welland said. "BMS isn't, but should it become available under Tariff 12, we would definitely refile for it."

PHOTOS ©1991 WALTER CALAHAN

Susan Morrow

Susan Morrow, affiliate communications manager for Kemper Financial Services, Inc. in Chicago, said the company had to refile its Tariff 12 to get an off-premises extension and foreign exchange lines.

These lines were not part of its original five-year, $7 million arrangement. "We were not allowed to bring in additional services without refiling," she said.

Many Tariff 12 users would like to see the refiling process eliminated altogether.

"We're waiting 45 days for the FCC today," said Bill Jewell, managing director of communications engineering for American Airlines, Inc. "We'd love to see the FCC speed up this process, but we don't know if that will ever happen."

American Airlines is in the midst of a refiling that will enable it to replace analog multipoint lines with digital point-to-point links. The refiling process began in late November and is expected to be completed by the end of the month, Jewell said.

The airline signed a five-year, $33.3 million Tariff 12 contract in 1988.

### Adding international links

Other users have refiled their options to add international lines. These users include MasterCard International, Inc., which has a three-year, $5.8 million Tariff 12 contract.

"We needed to add some dedicated international data circuits to our [custom network] so we refiled," said Ron Thornhill, vice-president of network service for MasterCard. The company was pleased that the refiling went smoothly and changes took effect in 45 days, he added.

"It boils down to how complex the refiling is," Thornhill said. "We didn't have a problem because ours wasn't a complicated refiling."

Like other Tariff 12 users, MasterCard would like to get new services faster. "If there's something they announced publicly and you want to get it in your Tariff 12, you [still] have to wait the 45 days," Thornhill said.

The refiling process has figured at least in part in some users' decisions to reject Tariff 12 in favor of custom nets offered by MCI Communications Corp. and US Sprint Communications Co.

Jim Kolbe, telecommunications director for United Stationers, Inc. in Des Plaines, Ill., opted for a custom network from US Sprint.

"This is more flexible than a Tariff 12 network. "If some new technology comes along, I don't want to have to [refile] my contract," Kolbe said.

# IBM, Novell finalize deal

*continued from page 6*

In support of his claims, Cannavino said IBM will release a new version of OS/2 LAN Server, Version 1.3, later this month.

Another question the deal raises is which LAN operating system will IBM offer for AIX. According to Cannavino, neither LAN Server nor NetWare are currently available for AIX; however, NetWare for AIX should be on the market by next year.

"We do not have a LAN Server version for AIX yet, but there is a LAN Manager version," he said. According to sources requesting anonymity, IBM has been developing a version of LAN Server for AIX.

The IBM-Novell deal could also have an effect on the future of smaller resellers.

"It's going to broaden the market initially," Freund said. "It's not going to decrease the market share for companies already there." There will, however, be an increased demand over time for larger networks, which smaller value-added resellers will not be as equipped to meet, he said.

The strengthened relationship between IBM and Novell could put a crimp in Banyan Systems, Inc.'s style, according to Freund.

"Banyan has the right product [but] their window of opportunity is shrinking," he said.

Initially, Banyan was able to differentiate itself from Novell and 3Com Corp. by providing corporatewide networking capabilities, Freund noted.

But now most of the major vendors are pushing enterprise-wide solutions.

The agreement with Novell is part of IBM's strategy to "link islands of hardware and software from many vendors," Cannavino said. That strategy focuses on client/server computing, according to Art Olbert, IBM director of Client/Server Computing.

"Very few people believed that we were going to embrace client/server computing," Olbert said. "This should be proof enough and put that criticism behind us."

IBM's vision of client/server computing includes a strong role for mainframe systems. IBM interviewed 400 users with LANs attached to wide-area nets and found their primary needs to be access to host data and bidirectional information exchange between LAN attached devices and hosts, Olbert said.

> The agreement with Novell is part of IBM's strategy to "link islands of hardware and software from many vendors."
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"What we're saying with this relationship is, let the LAN administrator be responsive to their local users needs via NetWare or LAN Server," he said. "But at the same time, provide the security of data management for the IS guys."

# Motorola unveils wireless LAN

*continued from page 2*

The Control Module connects to either a host system on an Ethernet network or directly to an Ethernet backbone. The Control Module manages the flow of traffic within a microcell and filters traffic between the backbone and the devices within the microcell.

The Control Module costs $3,995 and the User Module costs $3,495.

Although wireless LANs overcome the need for wiring, the products are complementary to structured cabling schemes, according to Ralph Ungermann, one of the founders of LAN vendor Ungermann-Bass, Inc. Ungermann spoke in support of wireless technology at the Motorola press conference.

"This is one of the most important announcements in computer networking for a long time," he said. "There is a bigger market for [wireless LANs] than most analysts think."

Ungermann said the market for laptop computers is growing rapidly, and he predicted the onset of portable distributed computing, a key component of which will be wireless LAN technology.

Beta-test users from The Boeing Co. and The Dow Chemical Co. reported at the press conference that they had successfully tested the product. Richard Shankle, telecommunications associate at Dow, said that although his firm does not have a migration plan for moving to wireless LAN technology, the technology looks promising.

"Wireless LANs make it possible to make decisions based on business reasons rather than on where there is wire," he said.

Ed Anderson, president of Computerland, and Alan Hald, chairman of MicroAge, Inc., also spoke at the press conference in support of the technology. According to Anderson, Computerland is in negotiations with Motorola about distributing the Altair product.

Motorola plans to sell Altair almost exclusively through resellers, value-added resellers and systems integrators.

# DEC enhances PathWorks

*continued from page 4*

The new version of PathWorks announced at the show, Version 4.0, includes support for Microsoft Windows 3.0. PathWorks 4.0 now supports the Network Device Interface Specification as well.

DEC also introduced DECquery, an SQL-based application for DOS and Microsoft Windows that provides access to DEC's Rdb and RMS data bases, as well as Oracle Corp.'s Oracle and IBM's DB2, VSAM and IMS data bases.

In addition, DEC unveiled the EtherWorks LC/TP 10BaseT Ethernet adapter card, an 8-bit card for Personal Computer XT- and low-end Personal Computer AT-compatible systems that use standard coaxial Ethernet cable.

The NetWare Coexistence option is expected to be available in the spring. The other products introduced at NetWorld should be available next month.

PathWorks for DOS Version 4.0 costs $195 per client. PathWorks for DOS (TCP/IP) costs $100, and PathWorks for DOS (NetWare Coexistence) carries no additional cost. Both packages require PathWorks for DOS 4.0. DECquery costs $130 per user, and EtherWorks LC/TP is priced at $295.

# Mainframes take LAN server role

*continued from page 1*

That weakness limits the mainframe's ability to function as a file server, which would require that it be able to ship large quantities of data to multiple end points, Peri said.

Kurt Ziegler, new business development manager for IBM, disagreed. All servers compensate for the time it takes them to access data by holding often-used files in cache, he said, and mainframes will be no exception.

Virtually everyone agrees that the premier use of a mainframe server will be as a tool to help users back up critical files on multiple LAN servers.

"At least 90% of PC LANs don't have a strong backup capability," said Michael Howard, president of Infonetics Research Institute, Inc., a consultancy in San Jose, Calif.

"From their beginnings, mainframes have had a lot of tools to back up files," he said.

Micro Tempus, Inc. of Montreal has announced a product that addresses that area and Phaser Systems, Inc. of San Francisco sells its NetWare for MVS and NetWare for VM products.

The Phaser products, for example, lets users move files to or from Novell, Inc. NetWare servers to an MVS or VM host for backup or data distribution, said John Mullen, founder of the company and its vice-president of new business development.

One user at a pharmaceutical company who requested anonymity said he was interested in using a mainframe to back up several critical applications, such as an automated telemarketing program, running on OS/2 servers.

Today, the company backs up those servers using a LAN-attached optical disk, which requires a LAN administrator to kick off the routine, rotate the disks and store them off-site.

"We have a long way to go," the user said. "Each vendor seems to be bringing one piece of the puzzle to the table."

IBM's LAN Resource Extension Services/VM, announced in late December, professes to solve that problem for NetWare LANs, Ziegler said. But it only works with VM mainframes. IBM has not announced an MVS version.

Analysts and users also expect the mainframe to play a role as a data base server in large organizations where users need access to corporatewide information such as customer records or accounting data.

Wayne Kernochan, senior analyst in the network computing strategies department of The Yankee Group, a Boston consultancy, said data base support will require a migration to a client/server architecture.

Much of the actual processing will move from the mainframe to personal computers or other intermediary machines, while only the data will remain on the mainframe.

Protocols such as IBM's LU 6.2 for communications and SQL for standard data base access will ease that transition.

But LU 6.2 and SQL address only part of the problem, according to Chip Steinmetz, vice-president of data processing at American Airlines Decision Technologies, Inc. in Fort Worth, Texas.

"There's application logic that has to happen at either end, and that's what holds people up," Steinmetz said. "The networking stuff's simple."

Decision Technologies recently developed an application in which a Unix machine extracts and processes airline pricing data stored on an MVS-based mainframe. A 3270 gateway and the High Level Language Application Program Interface, which automates 3270 routines, are used to provide automated access from the Unix machine to the mainframe.

End users employ desktop Unix workstations to access the Unix server processing the pricing data.

"The mainframe is becoming a data repository only," Steinmetz said. "We just allow it to be a big DB2 server that people out in the field all can get to, but we do the real work on a Unix box."

Another reason for using a mainframe as a server is to let LAN users take advantage of mainframe peripherals.

Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consultancy, said many large shops have high-speed laser printers attached to mainframes.

"You can write programs to take output from LANs to these printers" for especially large print jobs, Dzubeck said.

Phaser Systems' NetWare products support such print services, Mullen said, although he admitted it is not as seamless as users would like. Today, an extra command is required to make a NetWare file print on a host printer or a host file print on a NetWare printer.

"We could integrate them so a batch job running on the host could automatically print on a NetWare printer and a NetWare job could automatically spool out to a host output device," Mullen said.

When all is said and done, it is unlikely anyone will buy new mainframes to be employed as LAN servers.

"People will not buy a mainframe to be a server for a LAN," Infonetic's Howard said. "But they will use an existing mainframe as a server on a LAN."

# IBM wares let mainframes act as servers

BOSTON — IBM last week demonstrated two products — one announced and one prototype — that let users configure mainframes as servers for Novell, Inc. NetWare and IBM OS/2 LAN Server networks.

At NetWorld '91 Boston, IBM demonstrated LAN Resource Extension Services (LAN RES)/VM, which lets a VM mainframe act as a disk server for a NetWare 3.1.1. LAN.

The host can back up, restore and archive data from LAN servers or simply provide added space for users with large storage requirements.

IBM also showed a prototype product that enables a VM host to act as a full-fledged file server for IBM OS/2 LAN Server nets.

The LAN RES product, which was announced late last year and is currently available, only supports channel-attached PS/2 servers. For the NetWorld demo, IBM used one of its new System/390 mainframes.

"We replaced the [server's] disk card with a card that attaches to the 390, and the 390 just replaces that disk," said Kurt Ziegler, new business development manager at IBM. "Whatever NetWare does with its disk, that's exactly what this does."

The mainframe link is a 4.5M byte/sec device connection, similar to one for a tape or disk drive, as opposed to a communications connection such as a front-end processor would use.

"It doesn't have any of the protocol overhead associated with communications, which makes it very fast," Ziegler said. Mainframe channels have a distance limitation of 400 feet, although fiber extenders can increase that to more than five miles.

The VM host software costs $9,600 and the NetWare Loadable Module for each NetWare server costs $1,495. The PS/2 channel adapter card costs $8,030.

IBM also demonstrated its prototype product that lets a VM mainframe act as a file server for an IBM OS/2 LAN Server net.

That function involves a higher level of complexity than LAN RES because it works on the file level, not just the disk level.

With LAN RES, the mainframe does not have to keep track of the files it is storing, but the prototype does. That allows files to be accessed not only by LAN devices, but by devices attached to the host via a Systems Network Architecture network. The prototype product supplies the translation between ASCII and EBCDIC files.

Additionally, the prototype gives users more options for connecting the PS/2 server to the mainframe. The server can be linked to the mainframe via token-ring connections to cluster controllers or front-end processors, or it can be channel-attached.

The channel emulation card is different from the one used in LAN RES in that it emulates a channel itself, which means it attaches to the mainframe via a channel-to-channel adapter. That can extend the distance the server can be placed from the mainframe.

Ziegler declined to say if IBM is planning MVS versions of the two products it demonstrated, but he acknowledged that IBM has been getting requests from its customers to do so.

— *Paul Desmond*

# Switch upgrade widens options

*continued from page 2*

100,000 ports. By the end of 1992, MCI will have 80 switches in its network and 75% of those will have been upgraded to the larger port capacity.

"We have switches that are 'maxed out' at port size in the network," said Joe Terry Swaim, vice-president of switch systems engineering at MCI.

MCI has already installed three DSC MegaHub 600E switches in Creve Coeur, Mo., Dallas, and San Antonio, Texas, and one DMS-250 SuperNode Enhanced Network (Enet) switch in Irving, Texas. All three are handling commercial traffic. MCI plans to upgrade other DSC DEX 600 tandem switches to MegaHub 600E switches.

The carrier has upgraded its Northern Telecom DMS-250 switches with the company's SuperNode bus architecture and processors, which doubled the port capacity of the switches. During the next two years, MCI will further enhance the switches by adding Northern Telecom's Enet switch and Link Peripheral Processor (LPP) hardware and software. Enet, a stand-alone nonblocking circuit switch, is capable of handling switched T-1 speeds and supports services such as frame relay.

Swaim said the new switches will give MCI the platforms necessary to support services such as Integrated Services Digital Network and to roll out services such as switched T-1 and SONET.

"[The upgrade] positions us for switched T-1 [and] switched T-3, if we wish, Swaim said.

MCI is scheduled to offer switched T-1 service in the third quarter of this year and is currently beta-testing it with several customers. Switched T-1 service is handled with digital access and cross-connect systems (DACS), so Swaim said it is not necessary to complete the switch upgrades in order to provide that service.

Even if MCI decided to move from the DACS technology and provide switched T-1 through its network switches, all of the DMS-250s would not have to be upgraded to Enet, Swaim said, adding that MCI could provide nationwide coverage from only eight switches.

The upgrade will provide interfaces necessary to run fiber into the switch to support SONET also, Swaim said.

According to officials from DSC and Northern Telecom, the upgraded switches would give MCI the capability to provide frame relay services, but MCI did not commit to it.

The upgrades "position us architecturally for frame relay if we wish to [offer it]," Swaim said.

Although US Sprint Communications Co. and BT Tymnet, Inc. have announced that they will offer frame relay, MCI has not publicly announced support.

NETWORK WORLD

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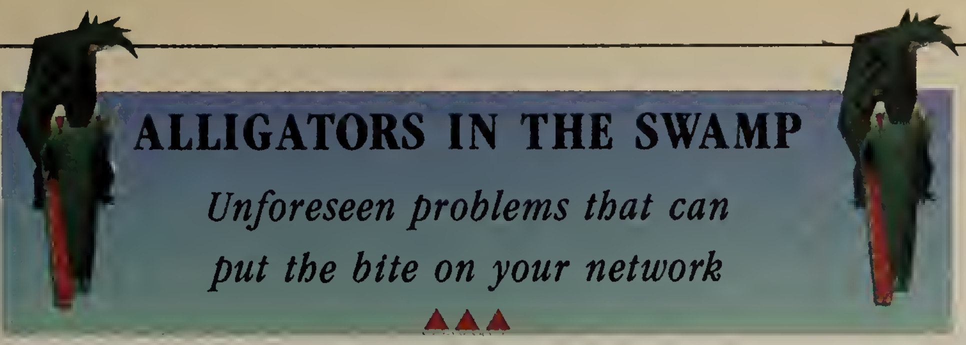


**ALLIGATORS IN THE SWAMP**

*Unforeseen problems that can put the bite on your network*

▲▲▲

# The Wednesday the network crashed

## Unshielded wiring and a freight elevator play havoc with a government net.

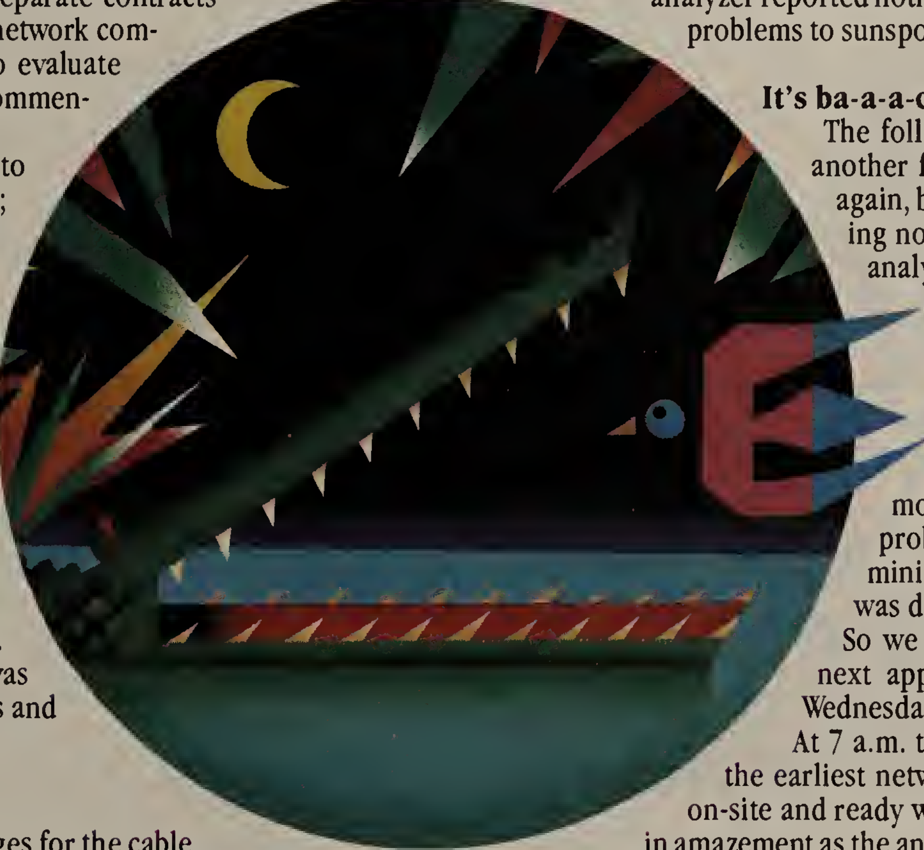
About 1½ years ago, my company was retained by an operating division of the U.S. Department of Health and Human Services to design and oversee the installation of a personal computer-based wide-area network. This WAN would eventually encompass more than 4,000 nodes in Washington, D.C. and 10 regional offices across the country.

Our job was to provide strategic planning and technical design services, make all the physical connections in the Washington-area offices and serve as an on-call troubleshooter.

Rather than entering into an all-encompassing systems integration contract, our client agency awarded separate contracts for the various parts of the overall task. A network communications engineering firm was hired to evaluate cabling system alternatives and make recommendations.

A specialty cable installer was called in to pull wire into the Washington-area offices; each regional site hired its own cable installer. A large net reseller was contracted to provide servers and server software, and a computer support contractor was hired to install workstations and provide operations and administrative support for the network.

The installation program had passed the halfway point (2,000 nodes installed and operational) with only minor difficulties. That is, until we hooked up the group of offices in the north wing of the "old building," located in the Capitol Mall. Constructed in the 1930s, the old building was a squat, massive monolith with high ceilings and wide hallways.



**Nowhere to run**

This building posed a number of challenges for the cable installers, particularly when runs were needed between floors. Due to its age, the building had no built-in wiring closets and very few usable conduits or channels. Sometimes, a huge, slow, water-lubricated core drill had to be used to cut 1-in. holes through eight or more inches of concrete flooring. In other areas, wiring was run through unused air shafts, risers and elevator shafts.

The Washington-area office networks were built around 4M bit/sec work group token rings, connected by 4M bit/sec token-ring backbones. In the early design and planning stages, the network communications engineering contractors had recommended the use of shielded twisted-pair wiring everywhere except in multistation access unit (MAU)-to-workstation connections, where unshielded twisted pair was recommended. At that time, computer industry journals were reporting broad claims about unshielded wiring's reliability when used in token-ring operations. The government compared the costs of installing and connecting shielded wiring vs. unshielded wiring and decided to gamble on the reliability of the unshielded wiring, which would be used in all but the longest runs and interbuilding links.

The network was to be installed incrementally, starting in the agency's Information Resources Management (IRM) staff office. The IRM staff reasoned that if the unshielded wiring turned out to be unreliable, they would find out first and could then have subsequent installations use shielded twisted pair.

After the cable installers finished an area, we would move in with racks, MAUs, connectors and tools, and then hook up the workstations and servers. As we brought up each ring, we would monitor it closely for several hours with a protocol analyzer. Bad connectors, cable segments, network interface cards and MAUs were replaced immediately.

After each office work group ring within the building was brought up on the local-area network, connected to the backbone and checked out with the protocol analyzer, it was turned over to the users. These systems operated for several weeks with no problems. Then one Wednesday morning, a network help desk staffer called us to pass on a deluge of frantic messages. The office system that we had installed just days before was experiencing massive problems. We assumed there was a problem with the cabling, connectors or concentrators.

Our technicians arrived at the site within hours, only to find that, according to network users, everything was back to normal. Our network protocol analyzer showed no particular problems, so we decided to passively monitor network performance for the next 24 hours.

The net ran fine all that day and the following day. Our protocol analyzer reported nothing unusual, so we attributed the original problems to sunspots and went on to other things.

**It's ba-a-a-ck**

The following Wednesday morning, we received another frantic call about network problems. But again, by the time we arrived, the net was operating normally. Once more, we left the protocol analyzer on-line for 24 hours and found no problems.

For several days, the network ran perfectly — until the next Wednesday morning, when users once again reported network problems.

What was happening Wednesday mornings that was causing the network problems? We grilled the users and LAN administrators, but they all swore that nothing was done differently on Wednesday mornings. So we simply resolved to be prepared for the next appearance of the condition on the next Wednesday morning.

At 7 a.m. the following Wednesday, an hour before the earliest network users arrived, our technicians were on-site and ready with the protocol analyzer. They watched in amazement as the analyzer showed network packet error rates go through the roof when no users were logged on to the network. It was as if something was literally pumping static into the line in long, slow bursts.

The network noise continued sporadically throughout the morning. During this time, our technicians traced the source of the problem to a specific trunk connecting two MAUs. This trunk ran between floors, using an ancient elevator shaft opening.

We immediately asked for permission to enter the elevator shaft to inspect the cabling. Our request was referred to Building Services, the department that controlled access to those shafts. Building Services promptly denied our request, explaining that the elevator was in use: A construction contractor used that particular elevator every Wednesday morning to bring supplies up to the roof. Obviously, this was the cause of our network problems.

The elevator power cables carried an extremely high current while in operation — something like 450 volts at 100 amps. This caused huge amounts of electrical noise to appear by induction on the unshielded twisted-pair cabling that ran through the same elevator shaft. Every Wednesday morning when the elevator was used, the resulting interference brought down the network.

As soon as the segment in the elevator shaft was switched from unshielded to shielded twisted pair, the Wednesday morning network problems disappeared.

In the end, the government decided it was a good idea to use the shielded wiring more often, especially where there was even the slightest concern about the electrical stability of the immediate environment. The network is almost fully installed now, and no other significant problems have arisen. ◘

*Tyson is a senior consultant with Synectics for Management Decisions, Inc., a computer services and consulting firm in Arlington, Va.*

**IT'S HARD TO DRAIN THE SWAMP** when those reptiles keep getting in the way. To share your "alligator story," call Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to (508) 820-3467.

By JIM TYSON

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